UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Farmington District
Farmington Field Office
6251 N College Blvd., Ste. A
Farmington, NM 87402

DECISION RECORD
for the
Western Refining Lybrook West Pipeline Project
NEPA No. DOI-BLM-NM-F010-2015-0099-EA

I. Decision

I have decided to select Alternative B for implementation as described in the September 2015 Western Refining West Lybrook Pipeline project. Based on my review of the Environmental Assessment (EA) and project record, I have concluded the Alternative B was analyzed in sufficient detail to allow me to make an informed decision. I have selected this alternative because the proposed treatments will provide Western Refining reasonable access across public lands to construct, operate, and terminate the West Lybrook pipeline project.

II. Conformance and Compliance

The proposed action is in conformance with the September 2003 BLM-FFO Resource Management Plan (RMP), with Record of Decision (ROD; BLM 2003b) as updated in December 2003. Pursuant to 40 CFR 1508.28 and 1502.21, this site-specific Environmental Assessment (EA) tiers into and incorporates by reference the information and analysis contained in the BLM-FFO Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS; BLM 2003a). The RMP was approved by the September 29, 2003 ROD (BLM 2003b), and updated in December 2003.

Specifically, the proposed action supports the following BLM policy:

> It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands. (BLM 2003b, 2-2 – 2-3)

Development of energy-related ROWs, such as pipelines, is one of the primary activities of the BLM-FFO lands program. Such ROWs receive environmental review on a case-by-case basis (BLM 2003b, 2-11). As required by NEPA, this EA addresses site-specific resources and effects of the proposed action that were not specifically covered within the PRMP/FEIS.

Western would comply with applicable Federal, State, and local laws and regulations. Necessary permits and approvals for the proposed project would be obtained prior to project implementation.

Many requirements regulating specific environmental elements are found in the appropriate elements sections of this EA (Chapter 3). Several permits, licenses, consultations, or other requirements are discussed below.

Clean Water Act

The proposed action would be in conformance with the Clean Water Act, as amended (CWA; 33 USC 1251 et seq.).

Section 401

Under Section 401 of the Clean Water Act (CWA), an applicant for a Federal license or permit to conduct an activity that may result in a discharge into a waterway of the U.S. must provide the Federal agency with a Section 401 Certification declaring that the discharge would comply with the CWA. The certification would be granted by the New Mexico Environment Department (NMED) located in Santa Fe, NM.

Section 402

Under Section 402 of the CWA, the U.S. Environmental Protection Agency (EPA) regulates storm water discharges from industrial and construction activities under the National Pollution Discharge Elimination System program. Permits are required if discharge[s] results in a reportable quantity for which notification is required (pursuant to 40 CFR 117.21, 40 CFR 302.6, or 40 CFR 110.6) or if the discharge contributes to a violation of a water quality standard.

Section 404

Under Section 404 of the CWA, the U.S. Army Corps of Engineers regulates the discharge of dredged or fill material into waters of the U.S., including wetlands. The Section 404 program is administered by the U.S. Army Corps of Engineers (USACE). Under the CWA, the USACE has jurisdiction over waters of the U.S. Waters of the U.S. are considered jurisdictional because they have a "significant nexus" to traditional navigable waters. The BLM-FFO and USACE - Durango Regulatory Office, Albuquerque District, have determined that jurisdictional waters (i.e., waters of the U.S.) within the BLM-FFO planning area may include U.S. Geological Survey (USGS) waterways (i.e., "blue lines" on USGS 1:24,000 topographic maps) and potentially tributaries to these USGS waterways.

The proposed pipeline corridor would cross 14 USGS waterways. The pipeline construction and maintenance would be covered by the Nationwide Permit 12 (Utility Line Activities) and would not need an individual permit. Additionally, several areas of potential wetlands were scrutinized along the proposed pipeline corridor and these areas are pending verification by the USACE.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA; 16 USC 470) requires Federal agencies to take into account the effects of their actions on historic properties, and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment. Compliance with the requirements of the NHPA is met by following the Protocol Agreement between the New Mexico BLM and New Mexico State Historic Preservation Officer, which is authorized by the Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (1997).

Clean Air Act

The Clean Air Act of 1972, as amended (CAA; 42 USC 7401 et seq.), establishes national ambient air quality standards (NAAQS) to control air pollution. In New Mexico, the NMED has adopted most of the CAA into the New Mexico Administrative Code (NMAC). The NMED issues construction and operating permits for air quality and enforces air quality regulations and permit conditions.

III. Finding of No Significant Impact

I have reviewed the direct, indirect and cumulative effects of the proposed activities documented in the EA for the Western Refining West Lybrook Pipeline Project. I have also reviewed the project record for this analysis. The effects of the proposed action and alternative[*s*] are disclosed

in the Alternatives and Environmental Consequences sections of the EA. I have determined that the approval of two rights-of-way grants to allow reasonable access across public lands to authorize Western Refining to construct, operate, maintain, and terminate a crude oil pipeline as described in the EA will not significantly affect the quality of the human environment. Accordingly, I have determined that the preparation of an Environmental Impact Statement is not necessary.

IV. Other Alternatives Considered

No reasonable alternatives to the proposed action have been developed that would result in significantly fewer impacts or any clear advantages over the proposed action. The proposed pipeline corridor follows the most economic and direct route based on the location of existing infrastructure, existing disturbance, and surface resources. Page 20 of the EA describes an alternative considered but eliminated from detailed study.

V. Rationale for the Decision

I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)). The proposed activities are not located in an ACEC containing relevant and important cultural values. Cultural resource surveys were conducted in the project area and a Cultural Resources Record of Review BLM Report Number 2015(III) 019F and 2015(III) 019.1F were prepared for the Lybrook West pipeline. Effects to the cultural sites in the areas will be mitigated by relocation of the pipeline, requiring that site protection barriers be placed prior to the pipeline construction, and monitoring sites during construction. Pages 31-32 of the September 2015 Environmental Assessment DOI-BLM-NM-F010-2015-0099 describe the effects to cultural resources

The proposed activities are not likely to adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (40 CFR 1508.27(b)(9)). The project does not contain any known populations or designated habitat for federally listed endangered or threatened species. Pages 29-31 of the September 2015 Environmental Assessment DOI-BLM-NM-F010-2015-0099 describe the effects to special management species.

I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)). The proposed activities are not located in an ACEC containing relevant and important cultural values. Cultural resource surveys were conducted in the project area and a Cultural Resources Record of Review BLM Report Number 2015(III) 019F and 2015(III) 019.1F were prepared for the Western Refining Lybrook West Pipeline Project. Effects to the cultural sites in the areas will be mitigated by relocation of the pipeline, requiring that site protection barriers be placed prior to the pipeline construction, and monitoring sites during construction. Pages 31-32 of the September 2015 Environmental Assessment DOI-BLM-NM-F010-2015-0099 describe the effects to cultural resources.

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VI. Public Involvement

The BLM-FFO publishes a NEPA log for public inspection. This log contains a list of proposed and approved actions within the BLM-FFO. The log is located on the BLM's New Mexico website (http://www.blm.gov/nm/st/en/prog/planning/nepa_logs.html).

There were two pre-disturbance onsite meetings held in the field for this proposed project. These pre-disturbance meetings were attended by Western, BLM-FFO, State representatives, and an environmental consultant (Nelson Consulting, Inc. [NCI]). These pre-disturbance meetings were conducted for the proposed project on December 9, 2014, and March 18, 2015. The Nageezi and Counselor Chapter Houses of the Navajo Nation were also invited to the meeting. A public invitation to the pre-disturbance onsite meeting was also posted online:

(http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_oil_and_gas/ffo_onsites.html).

However, no private citizens or groups attended the on-site pre-disturbance meetings.

A BLM-FFO Interdisciplinary Team meeting was held for the proposed project on March 3, 2015.

At the aforementioned meetings, potential issues of concern were identified by the BLM-FFO, State, and NCI representatives.

Based on the size and scale, routine nature, and potential impacts associated with the proposed action, no additional external scoping was conducted.

The EA for the proposed projects was posted on the Farmington Field Office external website and in the public room for a 30 day comment period from September 16, 2015 to October 16, 2015. No public comments were received by BLM-FFO concerning the proposed action.

VII. Administrative Review and Appeal

This decision may be appealed to the Interior Board of Land Appeals (IBLA), Office of the Secretary, in accordance with the regulations contained in 43 CFR Part 4. Any appeal must be filed within 30 days of this decision. Any notice of appeal must be filed with the Field Manager, Farmington Field Office, 6251 College Boulevard, Suite A, Farmington, NM 87402. The appellant shall serve a copy of the notice of appeal and any statement of reasons, written arguments, or briefs on each adverse party named in the decision, not later than 15 days after filing such document (see 43 CFR 4.413(a)). Failure to serve within the time required will subject the appeal to summary dismissal (see 43 CFR 4.413(b)). If a statement of reasons for the appeal is not included with the notice, it must be filed with the IBLA, Office of Hearings and Appeals, U. S. Department of the Interior, 801 North Quincy St., Suite 300, Arlington, VA 22203 within 30 days after the notice of appeal is filed with the Farmington Field Office Manager.

Notwithstanding the provisions of 43 CFR 4.21(a)(1), filing a notice of appeal under 43 CFR Part 4 does not automatically suspend the effect of the decision. This decision can be implemented immediately and remains in effect pending appeal according to 43 CFR 2881.10 (b). If you wish to file a petition for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal.

A petition for a stay is required to show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied;
(2) The likelihood of the appellant's success on the merits;
(3) The likelihood of immediate and irreparable harm if the stay is not granted; and
(4) Whether the public interest favors granting the stay.

In the event a request for stay or an appeal is filed, the person/party requesting the stay or filing the appeal must serve a copy of the appeal on the Office of the Field Solicitor: United States Dept. of the Interior, Office of the Solicitor, Southwest Regional Office, 505 Marquette Avenue NW, Suite 1800, Albuquerque, NM 87102.

Victoria Barr
District Manager
Farmington District Office

10/20/2015
Date

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Farmington District
Farmington Field Office
6251 N College Blvd., Ste. A
Farmington, NM 87402

Finding of No Significant Impact

Western Refining Lybrook West Pipeline Project
NEPA No. DOI-BLM-NM-F010-2015-0099-EA

FINDING OF NO SIGNIFICANT IMPACT

I have determined that the proposed action, as described in Environmental Assessment (EA) DOI-BLM-NM-F010-2015-0099 will not have any significant impact, individually or cumulatively, on the quality of the human environment. Because there would not be any significant impact, an Environmental Impact Statement is not required.

In making this determination, I considered the following factors:

Context

The Farmington Field Office (FFO) is located in northwestern New Mexico. The field office boundaries include approximately 7,800,000 acres; 1.4 million surface acres and an additional 1 million acres of mineral estate are managed by the BLM. The distribution of BLM-managed lands is fairly well consolidated in the north and becomes increasingly mingled with Tribal lands to the south. BLM-managed lands abut the Navajo Reservation to the west and south, Jicarilla Apache Nation Reservation to the east, and the Ute Mountain Reservation and Southern Ute Indian Reservation to the north. Aztec Ruins National Monument and Chaco Culture National Historical Park, managed by the National Park Service, lie within the field office boundaries. The BLM manages approximately 18% of lands within a 10 mile radius of Chaco Culture National Historical Park.

The FFO encompasses the New Mexico portion of the San Juan Basin. The San Juan Basin and surrounding areas have been occupied by varied cultures since the Paleo Indian period (circa 10,000 BC). The San Juan Basin and Four Comers area have one of the most extensive prehistoric and protohistoric occupations in the United States. The most commonly known archaeological resources are the Anasazi structures at Chaco Culture National Historical Park, Mesa Verde National Park, and other National Park Service sites. Scattered across BLM-managed lands are similar, but smaller structures, which were probably related to these larger sites. Twenty-three Chacoan outliers are known to exist within the FFO. Each contains at least one Chacoan structure and most have associated communities, prehistoric roads, and great kivas along with features such as herraduras and special use areas. The FFO contains an extensive system of finely engineered roads radiating out form Chaco Canyon and extending a considerable distance to outlying sites through the San Juan Basin and beyond. These roads are remarkably straight and carefully constructed. The most notable is the Great North Road, which starts at Chaco Canyon and run north to the Aztec Ruins.

Located within the boundary of the FFO is much of Dinétah, the ancestral homeland to the Navajo. Here the Navajo constructed forked-stick hogans, shades, sweat lodges, and other structures over a several hundred year span. During a short period between 1680 and the mid-1700s, pueblitos were constructed, often associated with other structures. Although not firmly dated, extensive Navajo pictograph and petroglyph sites were painted, etched, pecked, or ground onto the sandstone cliffs of the canyons of Dinétah. Most are believed to be ceremonial art which is no longer traditionally executed in a permanent form.

Native American Traditional and Sacred Areas are known to exist across the FFO. Many are associated with narrative accounts of origin or other traditional stories. Most of the identified sacred areas are associated with the Navajo culture. These places are still important in Navajo ceremonies and daily activities.

Historic Hispanic or Spanish and Anglo sites within the San Juan Basin primarily date from the late 1800s to the present. Although there are some early Spanish land grants in the southern portion of the FFO, most historic sites located on public lands are either Hispanic or Anglo homesteads with associated structures from the late 1800s and early 1900s. Associated with many clusters of homesteads were a school house and often a church which was visited every few months by a priest.

Cultural resource inventories have been conducted throughout the FFO for project undertakings, management studies, and scientific inquiries. As of April 2014, approximately 760,000 acres of the 7,800,000 acres in the FFO boundaries have been inventoried. Over 46,000 sites have been identified ranging from small artifacts to the 800-room structures in Chaco Canyon. Many of these sites are listed on the National Register of Historic Places and Chaco Culture National Historical Park along with several of the Chacoan sites which have been placed on the World Heritage List. The FFO manages 79 Areas of Critical Environmental Concern (ACECs) for relevant and important cultural values, including five World Heritage Sites.

The San Juan Basin is an important area for mammalian and reptilian fossils. A variety of paleontological resources exist in the FFO including animal fossils, fossil leaves, palynomorphs, petrified wood, and trace fossils occurring in the Triassic, Jurassic, Cretaceous, and Tertiary rocks. Dinosaur and other fossils have made significant contribution to the scientific record have been found and excavated in the FFO. Paleontolgical resources are present in the Bisti De-Na-Zin Wilderness Area, Ah-Shi-Sle-Pa Wilderness Study Area, Fossil Forrest Research Natural Area, and seven fossil areas identified in the 2003 Farmington Resource Management Plan.

The San Juan Basin is one of the largest natural gas fields in the nation and has been under development for more than 60 years. Oil was discovered by accident in the Seven Lakes area of McKinley County in 1911. Natural gas was discovered near Aztec, New Mexico, in 1920-1921 with oil of commercial quantity discovered near the Hogback in 1922 (Barnes 1951). Several small pipelines were built to carry the oil and gas from these discoveries to Aztec and Farmington, respectively. Development began in earnest in the late 1940s and early 1950s as the demand for natural gas increased. The FFO manages 2,765 active oil and gas leases in the San Juan Basin consisting of 2.1 million acres. Leasing began in the mid-1930s and accelerated in the late 1940s. By 1950, over 1 million acres were under lease.

In 1951, El Paso Natural Gas completed the first interstate pipeline out of the San Juan Basin to California. That same year, oil was discovered in the Mancos Shale in Dogie Canyon (Barnes 1951). Since that time, over 30,000 oil and gas wells have been drilled in the San Juan Basin with approximately 16,000 associated rights-of-way. Approximately 23,000 wells are currently producing. Since Stanolind Oil introduced hydraulic fracturing in 1949, nearly every well in the San Juan Basin has been fracture stimulated.

Intensity

1. The activities described in the proposed action do not include any significant beneficial or adverse impacts (40 CFR 1508.27(b)(1)). Per 40 CFR 1500.1(b), the EA concentrated on issues that are truly significant to the action in question, rather than amassing needless detail. Issues have a cause and effect relationship with the proposed action or alternatives; are within the scope of the analysis; have not been decided by law, regulation, or previous decision; and are amendable to scientific analysis rather than conjecture (BLM 2008, page 40). The following issues were identified related to the proposed action:

- How would dust and equipment emissions created from the proposed project impact air resources?
- How would vegetation-clearing, proposed project activities, and final reclamation impact soils, including fragile soils?
- How would vegetation clearing, proposed project activities, and final reclamation associated with the proposed project impact upland vegetation?

- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed project impact the establishment and distribution of noxious weeds and invasive species in the area?
- How would vegetation clearing, proposed project activities, and final reclamation impact wildlife, including migratory birds?
- How would vegetation clearing, proposed project activities, and final reclamation impact the following BLM Special Status Species (SSS): Aztec gilia (*Aliciella formosa*), Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*), Bendire's thrasher (*Toxostoma bendirei*), ferruginous hawk (*Buteo regalis*), pinyon jay (*Gymnorhinus cyanocephalus*), and golden eagle (*Aquila chrysaetos*)?
- How would surface-disturbing activities associated with construction of the proposed project impact paleontological resources?
- How would surface-disturbing activities associated with construction of the proposed project impact cultural resources?
- How would surface-disturbing activities, proposed project activities, and final reclamation impact travel and transportation management?
- How would vegetation clearing, proposed project activities, and final reclamation impact livestock?
- How would proposed project activities impact environmental justice?
- How would proposed project activities impact public health and safety?

The EA includes a description of the expected environmental consequences of the proposed activities for those issues in Chapter 3.

2. The activities included in the proposed actionwould not significantly affect public health or safety (40 CFR 1508.27(b)(2)). The following design features have been included in the proposed action to address any impacts to public health and safety:

The hauling of equipment and materials on public roads would comply with Department of Transportation regulations. Any accidents involving persons or property would immediately be reported to the BLM-FFO. Western would notify the public of potential hazards by posting signage (e.g., trucks turning or construction ahead), having flaggers, or using lighted signs, as necessary.

Worker safety incidents would be reported to the BLM-FFO as required under Notice to Lessees (NTL) -3A (USGS 1979). Western would adhere to company safety policies and Occupational Safety and Health Administration regulations. Western would comply with pipeline safety regulations (49 CFR 190 and 192). The proposed pipeline trench would be excavated and sloped in accordance with OSHA specifications.

The soil stockpiles and pipe string would also be used as safety barriers during construction of the proposed pipeline. If a pipeline trench is left open at a road crossing, orange safety fencing or barricades would be installed, if needed. During construction, access to the proposed pipeline corridor would be limited to pipeline construction crews.

3. The proposed activities would not significantly affect any unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas (40 CFR 1508.27(b)(3)). Unique characteristics are generally limited to those that have been identified through the land use planning process or other legislative, regulatory or planning processes (BLM 2008, page 71). The FFO does not contain any prime and unique farmlands, suitable or designated wild and scenic rivers, or designated caves. Table 1 discloses the distance of the proposed activities to identified wetlands. Table 2 discloses the distance of the proposed activities to National Park Service units and Congressionally designated areas The proposed action and alternatives are not located within an Area of Critical Environmental Concern. Impacts to historic or cultural resources are described in the Cultural Resources section of the EA and discussed further under item 8.

Table 1. Distance of the Proposed Activities from Identified Wetlands

Identified Wetlands	Distance from Proposed Activities
Bancos	48.9 miles
Blanco	36.8 miles

Bloomfield	38.2 miles
Cutter Canyon	32 miles
Carrizo Oxbow	30.1 miles
Desert Hills	40.8 miles
Valdez	38.8 miles

Table 2. Distance of the Proposed Activities from Park Lands and Ecologically Critical Areas

Park Land or Ecologically Critical Area	Distance from Proposed Activities
Ah-Shi-Sle-Pah Wilderness Study Area	8.8 miles
Aztec Ruins National Monument	48.2 miles
Bisti De-Na-Zin Wilderness Area	18.8 miles
Chaco Culture National Historical Park	11 miles
Fossil Forest Research Natural Area	19.7 miles

4. The activities described in the proposed action do not involve effects on the human environment that are likely to be highly controversial (40 CFR 1508.27(b)(4)). Controversy in this context means disagreement about the nature of the effects, not expressions of opposition to the proposed action or preference among the alternatives (BLM 2008, page 71). Oil and gas development has occurred in the San Juan Basin for more than 60 years. While there may be controversy over the appropriateness of oil and gas development, there is not a high level of controversy or substantial scientific dispute over the impacts of that activity. The impacts of the proposed activities are described in Chapter 3 of the EA.

5. The activities described in the proposed action do not involve effects that are highly uncertain or involve unique or unknown risks (40 CFR 1508.27(b)(5)). As described under Context, oil and gas development has occurred in the San Juan Basin since the late 1940s and early 1950s. The field office has permitted over 30,000 wells and 16,000 rights-of-way. Hydraulic fracturing has occurred on nearly every well in the San Juan Basin since the 1950s. As such, the FFO has decades of experience and is knowledgeable about the impacts and risks associated with the proposed activities.

6. My decision to implement these activities does not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration (40 CFR 1508.27(b)(6)). Approval of these activities in no way assures approval of any future activities.

7. The effects of the proposed activities would not be significant, individually or cumulatively, when considered with the effects of other actions (40 CFR 1508.27(b)(7)). Direct, indirect, and cumulative impacts are described in Chapter 3 of the EA.

8. I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)). The proposed activities are not located in an ACEC containing relevant and important cultural values. Cultural resource surveys were conducted in the project area and a Cultural Resources Record of Review BLM Report Number 2015(III) 019F and 2015(III) 019.1F were prepared for the Western Refining Lybrook West Pipeline Project. Effects to the cultural sites in the areas will be mitigated by relocation of the pipeline, requiring that site protection barriers be placed prior to the pipeline construction, and monitoring sites during construction. Pages 31-32 of the September 2015 Environmental Assessment DOI-BLM-NM-F010-2015-0099 describe the effects to cultural resources.

9. The proposed activities are not likely to adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (40 CFR 1508.27(b)(9)). The project does not contain any known populations or designated habitat for federally listed endangered or threatened species. Pages 29-31 of the September 2015 Environmental Assessment DOI-BLM-NM-F010-2015-0099 describe the effects to special management species.

10. The proposed activities will not threaten any violation of Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)). Sections 1.4 and 1.5 of the EA describe the relationship of the proposed activities to relevant laws, policies, regulations, and plans.

REFERENCES

Barnes, Frank C., 1951. History of development and production of oil and gas in the San Juan Basin. In *The south and west sides of the San Juan Basin, New Mexico and Arizona*, Smith, C.T.; Silver, C. ed(s), New Mexico Geological Society, Guidebook, 2nd Field Conference, pp. 155-160.

BLM. 2008. *National Environmental Policy Handbook. H-1790-1.* Bureau of Land Management. National Environmental Policy Act Program.

APPROVED:

Victoria Barr
District Manager
Farmington District Office

10/20/2015
Date

United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-NM-F010-2015-0099

Western Refining
Lybrook West Pipeline Project

September 2015

U.S. Department of the Interior
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It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

Western Refining (Western) has submitted one Right of Way Grant Application (ROW) to the Bureau of Land Management – Farmington Field Office (BLM-FFO) for Western's Lybrook West Pipeline Project (Lybrook West). The proposed action is for the approval of one ROW application by the BLM-FFO including the construction, temporary use areas, and permanent ROW that would be required to construct, operate, and maintain the Lybrook West 10 inch diameter, buried, steel pipeline.

The proposed Lybrook West project would be a total of 73,722 feet (13.96 miles) in length. The proposed Lybrook West project would cross 64,591-feet (12.23 miles) of land under the jurisdiction of the BLM-FFO; 5,407-feet (1.02 miles) crossing land under the jurisdiction of the New Mexico State Land Office (State); and 3,724-feet (0.70 mile) of Private (Fee) land. The proposed project would disturb approximately 88.6 acres during construction (See Chapter 2, Section 2.2.2, Proposed Surface Disturbance, and Table 3 - Surface Disturbance Associated with Proposed Project for specific details). The proposed width applied for by Western would be 50 feet in width on BLM-FFO- and Fee-managed surface during construction with a 30-foot permanent ROW corridor for operation and maintenance, and 30 feet in width for construction on State-managed surface with a 30-foot permanent ROW corridor for Operation and Maintenance. The proposed ROW Grant application would apply only to the BLM-FFO portion of the project. The proposed project area's State-managed surface would be permitted under a Surface Use Agreement between Western and the State, and the Fee-managed surface would be permitted by a Surface Use Agreement/Easement between Western and the private land owner (Fee-managed). The majority of the proposed pipeline corridor would parallel existing disturbances, including an existing pipeline corridor, existing access roads, and existing oil and natural gas well pads.

The proposed project would include the construction, operation and maintenance, and eventually the final abandonment of the proposed pipeline under the approved ROW Grant. The proposed pipeline would transport crude oil from the existing Western facilities at Lybrook, New Mexico to Western's existing 16-inch pipeline (formerly TexNew Mexico Pipeline).

The proposed Lybrook West project would also include the construction, usage, and reclamation of 17 Temporary Use Areas (TUAs). There would be approximately 5.3 acres on land under the jurisdiction of the BLM-FFO and 1.2 acres on land under the jurisdiction of the State-managed surface) that would be associated with the TUAs on the proposed project. The proposed TUAs would all be permitted under a single BLM-approved ROW Grant.

The proposed project area is located within the San Juan Basin in Rio Arriba, Sandoval, and San Juan Counties, New Mexico. The proposed project area is approximately 48 miles south of the town of Bloomfield, New Mexico. The proposed project begins in the community of Lybrook, in Rio Arriba County, New Mexico, and ends in rural San Juan County, New Mexico, approximately 40 miles southeast of Bloomfield, NM. (See Figure A.1, Appendix A).

1.2. Purpose and Need for Action

The purpose of the proposed action is to allow Western reasonable access to BLM-FFO-managed surface for the construction and operation and maintenance for a new 10-inch diameter, buried, steel pipeline for the transportation of crude to be refined into gasoline and diesel for transportation consumption by the public and various, federal, state, and local agencies.

The need for the proposed action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, as amended (30 United States Code [USC] 181 et seq.), and the Federal Land Policy and Management Act of 1976 (FLPMA, 43 USC 1701 et seq.) to respond to a request for a ROW Grant over land under the jurisdiction of the BLM-FFO.

1.3. Decision to be Made

The BLM-FFO will decide whether or not to issue the ROW associated with the proposed project, and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA; Public Law 91-90, 42 USC 4321 et seq.), the BLM-FFO must determine if there are any significant environmental impacts associated with the proposed action warranting further analysis in an Environmental Impact Statement (EIS). The BLM-FFO Field Manager is the responsible officer who will decide one of the following:

- To approve the ROW with design features as submitted
- To approve the ROW with additional mitigation added
- To analyze the effects of the proposed action in an EIS
- To require that additional alternatives be provided
- To deny the ROW

1.4. Conformance with Applicable Land Use Plan(s)

The proposed action is in conformance with the September 2003 BLM-FFO Resource Management Plan (RMP), with Record of Decision (ROD; BLM 2003b) as updated in December 2003. Pursuant to 40 CFR 1508.28 and 1502.21, this site-specific Environmental Assessment (EA) tiers into and incorporates by reference the information and analysis contained in the BLM-FFO Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS; BLM 2003a). The RMP was approved by the September 29, 2003 ROD (BLM 2003b), and updated in December 2003.

Specifically, the proposed action supports the following BLM policy:

> It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands. (BLM 2003b, 2-2 – 2-3)

Development of energy-related ROWs, such as pipelines, is one of the primary activities of the BLM-FFO lands program. Under the authority of FLPMA and the Mineral Leasing Act of 1920, the FFO grants ROW leases and permits to qualified individuals, businesses, and government entities for use of public lands. Such ROWs receive environmental review on a case-by-case basis (BLM 2003b, 2-11). As required by NEPA, this EA addresses site-specific resources and effects of the proposed action that were not specifically covered within the PRMP/FEIS.

1.5. Relationship to Statutes, Regulations or Other Plans

Western would comply with applicable Federal, State, and local laws and regulations. Necessary permits and approvals for the proposed project would be obtained prior to project implementation.

Many requirements regulating specific environmental elements are found in the appropriate elements sections of this EA (Chapter 3). Several permits, licenses, consultations, or other requirements are discussed below.

1.5.1. Clean Water Act

The proposed action would be in conformance with the Clean Water Act, as amended (CWA; 33 USC 1251 et seq.).

Section 401

Under Section 401 of the Clean Water Act (CWA), an applicant for a Federal license or permit to conduct an activity that may result in a discharge into a waterway of the U.S. must provide the Federal agency with a Section 401 Certification declaring that the discharge would comply with the CWA. The certification would be granted by the New Mexico Environment Department (NMED) located in Santa Fe, NM.

Section 402

Under Section 402 of the CWA, the U.S. Environmental Protection Agency (EPA) regulates storm water discharges from industrial and construction activities under the National Pollution Discharge Elimination System program. Permits are required if discharge[s] results in a reportable quantity for which notification is required (pursuant to 40 CFR 117.21, 40 CFR 302.6, or 40 CFR 110.6) or if the discharge contributes to a violation of a water quality standard.

Section 404

Under Section 404 of the CWA, the U.S. Army Corps of Engineers regulates the discharge of dredged or fill material into waters of the U.S., including wetlands. The Section 404 program is administered by the U.S. Army Corps of Engineers (USACE). Under the CWA, the USACE has jurisdiction over waters of the U.S. Waters of the U.S. are considered jurisdictional because they have a "significant nexus" to traditional navigable waters. The BLM-FFO and USACE - Durango Regulatory Office, Albuquerque District, have determined that jurisdictional waters (i.e., waters of the U.S.) within the BLM-FFO planning area may include U.S. Geological Survey (USGS) waterways (i.e., "blue lines" on USGS 1:24,000 topographic maps) and potentially tributaries to these USGS waterways.

The proposed pipeline corridor would cross 14 USGS waterways. The pipeline construction and maintenance would be covered by the Nationwide Permit 12 (Utility Line Activities) and would not need an individual permit. Additionally, several areas of potential wetlands were scrutinized along the proposed pipeline corridor and these areas are pending verification by the USACE.

1.5.2. National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA; 16 USC 470) requires Federal agencies to take into account the effects of their actions on historic properties, and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment. Compliance with the requirements of the NHPA is met by following the 2014 Protocol Agreement between the New Mexico BLM and New Mexico State Historic Preservation Officer, which is authorized by the Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (2012).

1.5.3. Clean Air Act

The Clean Air Act of 1972, as amended (CAA; 42 USC 7401 et seq.), establishes national ambient air quality standards (NAAQS) to control air pollution. In New Mexico, the NMED has adopted most of the CAA into the New Mexico Administrative Code (NMAC). The NMED issues construction and operating permits for air quality and enforces air quality regulations and permit conditions.

1.6. Scoping, Public Involvement, and Issues

1.6.1. Scoping and Public Involvement

The BLM-FFO publishes a NEPA log for public inspection. This log contains a list of proposed and approved actions within the BLM-FFO. The log is located on the BLM's New Mexico website (http://www.blm.gov/nm/st/en/prog/planning/nepa_logs.html).

There were two pre-disturbance onsite meetings held in the field for this proposed project. These pre-disturbance meetings were attended by Western, BLM-FFO, State representatives, and an environmental consultant (Nelson Consulting, Inc. [NCI]). These pre-disturbance meetings were conducted for the proposed project on December 9, 2014, and March 18, 2015. The Nageezi and Counselor Chapter Houses of the Navajo Nation were also invited to the meeting. A public invitation to the pre-disturbance onsite meeting was also posted online at:

(http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_oil_and_gas/ffo_onsites.html).

However, no private citizens or groups attended the on-site pre-disturbance meetings.

A BLM-FFO Interdisciplinary Team meeting was held for the proposed project on March 3, 2015.

At the aforementioned meetings, potential issues of concern were identified by the BLM-FFO, State, and NCI representatives.

Based on the size and scale, routine nature, and potential impacts associated with the proposed action, no additional external scoping was conducted.

The EA for the proposed projects was posted on the Farmington Field Office external website and in the public room for a 30 day comment period from September 19, 2015 to October 16, 2015.No public comments were received by BLM-FFO concerning the proposed action.

1.6.2. Issues to be Analyzed

The following issues were identified during internal scoping as potential issues of concern for the proposed action. These issues will be addressed in this EA.

- How would dust and equipment emissions created from the proposed project impact air resources?
- How would vegetation-clearing, proposed project activities, and final reclamation impact soils, including fragile soils?
- How would vegetation-clearing, proposed project activities, and final reclamation impact surface waters?
- How would vegetation clearing, proposed project activities, and final reclamation associated with the proposed project impact upland vegetation?
- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed project impact the establishment and distribution of noxious weeds and invasive species in the area?
- How would vegetation clearing, proposed project activities, and final reclamation impact wildlife, including migratory birds?
- How would vegetation clearing, proposed project activities, and final reclamation impact the following BLM Special Status Species (SSS): Aztec gilia (*Aliciella formosa*), Brack's fishhook

maintenance, and final abandonment of the 10-inch diameter, buried steel crude oil pipeline. The proposed pipeline would be 73,722 feet (13.96 miles) long. Of this, 64,591 feet (12.23 miles) would travel across BLM-FFO surface; 5,407 feet (1.02) would travel across State surface; and 3,724 feet (0.70 mile) would travel across Fee surface. The proposed ROW Grant would apply only to the BLM portion of the extension.

During construction, 17 temporary use areas (TUAs); 15 on BLM-managed surface and two on State-managed surface would be utilized for the proposed project.

Commencement of the proposed project would take place upon receipt of the ROW Grant from the BLM-FFO. Construction plats and photographs associated with the proposed project are provided in Appendices C and D, respectively.

2.2.1. Location of Proposed Project Area

The proposed project area is located within the San Juan Basin, within Rio Arriba, San Juan and Sandoval Counties, New Mexico. The proposed pipeline begins at the Western Refining facilities located adjacent to U.S. Highway 550 in the community of Lybrook, New Mexico, and proceeds south for approximately 2.5 miles and thence west for approximately 11.5 miles.

The general region surrounding the proposed project area is characterized by fairly level (0 – 3 percent slopes) to gently rolling (3 – 6 percent slopes) to moderately steep (6 – 10 percent slopes), and steep (10 – 45% slopes) terrain. Elevation of the proposed project area ranges from 6,675 to 7,340 feet above mean sea level (AMSL). The legal location (New Mexico Principal Meridian) for the proposed project area is provided in the table below.

The proposed project area is located as follows:

Latitude and Longitude (Universe Transverse Mercator, North American Datum of 1983 [NAD 1983]:

- North Terminus (Beginning of Line [B.O.L.]): 36.13498010° North and 107.33150990° West
- Southwest Terminus (End of Line [E.O.L.]): 36.09265029° North and 107.43149354° West

Table 1: Legal Land Description for Project Features

Facility	Land Manager	Legal Location (New Mexico Principal Meridian)		
		Quarter-Quarter	Section	Township & Range
Pipeline Corridor	Fee	Northeast ¼ of the Northeast ¼	15	Township 23 North Range 7 West
	BLM	Southeast ¼ of the Northeast ¼		
	BLM	East ½ of the Southeast ¼		
	BLM	East ½ of the Northeast ¼	22	
	Fee	Southwest ¼ of the Northwest ¼	23	
	Fee	Northwest ¼ of the Southwest ¼		
	Fee	Southwest ¼ of the Southwest ¼		
	Fee	Southeast ¼ of the Southwest ¼		
	BLM	East ½ of the Northwest ¼	26	
	BLM	South ½ of the Northwest ¼		
	BLM	Southeast ¼ of the Northeast ¼	27	
	BLM	Northeast ¼ of the Southeast ¼		
	BLM	Southwest ¼ of the Southeast ¼		
	BLM	Western ½ of the Northeast ¼	34	
	BLM	Southeast ¼ of the Northwest ¼		
	BLM	Northwest ¼ of the Southwest ¼		

cactus (*Sclerocactus cloveriae* var. *brackii*), Bendire's thrasher (*Toxostoma bendirei*), ferruginous hawk (*Buteo regalis*), pinyon jay (*Gymnorhinus cyanocephalus*), and golden eagle (*Aquila chrysaetos*)?

- How would surface-disturbing activities associated with construction of the proposed project impact paleontological resources?
- How would surface-disturbing activities associated with construction of the proposed project impact cultural resources?
- How would surface-disturbing activities, proposed project activities, and final reclamation impact travel and transportation management?
- How would vegetation clearing, proposed project activities, and final reclamation impact livestock?
- How would proposed project activities impact environmental justice?
- How would proposed project activities impact public health and safety?

1.6.3. Issues Considered but not Analyzed

The following issues were identified during scoping as issues of concern that would not be impacted by the proposed action or that have been covered by prior environmental review. These issues will not be analyzed in this EA.

Areas of Critical Environmental Concern (ACECs)

The nearest Area of Critical Environmental Concern, the Chacoan Roads ACEC, to the proposed action is 12.6 miles to the west of the western most extent of the proposed pipeline. Ah-shi-sle-pah Wilderness Study Area is nine miles to the west of the western most extent of the proposed pipeline.

U.S. Fish and Wildlife Service (USFWS)-Listed Species

Under Section 7 of the Endangered Species Act of 1973 (ESA; 16 USC 1531-1544), all Federal agencies are required to consult with the USFWS or National Marine Fisheries Service if they are proposing an action that may affect listed species or designated habitat. Consultation with the USFWS was conducted as part of the PRMP/FEIS to address the cumulative effects of RMP implementation (Consultation No. 2-22-01-1-389, Appendix M of the PRMP/FEIS). Based on a review of species currently listed by the USFWS as occurring in Rio Arriba, Sandoval, and San Juan Counties (USFWS 2015), as well as the location of the proposed project area and habitat within the proposed project area, the potential does not exist for USFWS-listed species to occur within the proposed project area (see Biological Survey Report [BSR], Appendix B).

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Alternative A: No Action

Under the No Action alternative, the proposed project ROW would not be approved. The proposed pipeline would not be constructed. Current land and resource uses would continue to occur in the proposed project area. The No Action Alternative provides a baseline reference, enabling decision maker(s) to compare the magnitude of environmental effects of the alternatives.

2.2. Alternative B: Proposed Action

The proposed action is the BLM-FFO approval of the ROW associated with Western's proposed Lybrook West Pipeline Project. The proposed project would include the construction/installation, operation and

Facility	Land Manager	Legal Location (New Mexico Principal Meridian)		
		Quarter-Quarter	Section	Township & Range
	BLM	North ½ of the Southeast ¼	33	
	BLM	Northeast ¼ of the Southwest ¼		
	BLM	Southwest ¼ of the Southwest ¼		
	State	South ½ of the Southeast ¼	32	
	State	South ½ of the Southwest ¼		
	BLM	South ½ of the Southeast ¼	31	
	BLM	Southeast ¼ of the Southwest ¼		
	BLM	North ½ of the Northwest ¼	6	Township 22 North Range 7 West
	BLM	North ½ of the Northeast ¼	1	Township 22 North Range 8 West
	BLM	North ½ of the Northwest ¼		
	BLM	North ½ of the Northeast ¼	2	
	BLM	North ½ of the Northwest ¼		
	BLM	Southeast ¼ of the Southwest ¼	35	Township 23 North Range 8 West
	BLM	North ½ of the Northeast ¼	3	Township 22 North Range 8 West
	BLM	North ½ of the Northwest ¼		
	BLM	Northeast ¼ of the Northeast ¼	4	
	BLM	Southeast ¼ of the Northeast ¼		
	BLM	Southwest ¼ of the Northeast ¼		
	BLM	South ½ of the Northwest ¼		
	BLM	Northeast ¼ of the Southeast ¼	5	
	BLM	Northwest ¼ of the Southeast ¼		
	BLM	Southwest ¼ of the Northeast ¼		
	BLM	South ½ of the Northwest ¼		
	BLM	Southeast ¼ of the Northeast ¼	6	
	BLM	Northeast ¼ of the Southeast ¼		
	BLM	Southeast ¼ of the Southeast ¼		
	BLM	Southwest ¼ of the Southeast ¼		
	BLM	Northwest ¼ of the Northeast ¼	7	
	BLM	Southwest ¼ of the Northeast ¼		
TUA # 1	BLM	Southeast ¼ of the Northeast ¼	15	Township 23 North Range 7 West
TUA # 2	BLM			
TUA # 3	BLM	Northeast ¼ of the Southeast ¼		
TUA #4	BLM	Northeast ¼ of the Northeast ¼	22	
TUA # 5	BLM	Southwest ¼ of the Southeast ¼	27	
	BLM	Northwest ¼ of the Northeast ¼	34	
TUA # 6	BLM	Northwest ¼ of the Southwest ¼	34	
	BLM	Northeast ¼ of the Southeast ¼	33	
TUA # 7	BLM	Northwest ¼ of the Southeast ¼		
TUA # 8	BLM	Southwest ¼ of the Southwest ¼		

Facility	Land Manager	Legal Location (New Mexico Principal Meridian)		
		Quarter-Quarter	Section	Township & Range
TUA # 9	State	South ½ of the Southeast ¼	32	Township 22 North Range 8 West
TUA # 10	State	Southeast ¼ of the Southwest ¼		
TUA # 11	BLM	Northeast ¼ of the Northeast ¼	3	
TUA # 12	BLM	Northwest ¼ of the Northwest ¼		
TUA # 13	BLM	Northwest ¼ of the Northwest ¼		
TUA # 14	BLM	Northwest ¼ of the Southeast ¼	5	
TUA # 15	BLM	Northwest ¼ of the Southeast ¼		
TUA # 16	BLM	Southwest ¼ of the Southeast ¼	6	
TUA # 17	BLM	Northwest ¼ of the Northeast ¼	7	

Existing and proposed oil and gas lease roads, well pads, pipeline corridors, power lines, and facilities are in the general vicinity of the proposed project area. The majority of the approximately 73,722-foot length proposed pipeline corridor would overlap existing pipeline disturbances and roadways, including San Juan County Roads 7900 and 7950. The western terminus of the proposed pipeline ends at Western's existing 16-inch pipeline (Formerly TexNew Mexico Pipeline).

Maps and photographs of the proposed project area are provided in Appendices A and D, respectively. The proposed project area is plotted on the Lybrook and Lybrook West, New Mexico, 7.5-minute USGS quadrangles (Figure A.2) and the 2011 Rio Arriba, Sandoval, and San Juan County National Agriculture Imagery Program aerial photograph (Figure A.3 – A.12).

2.2.2. Description of Proposed Project and Design Features

For a detailed description of design features and construction practices associated with the proposed project, refer to the ROW's on file at the BLM-FFO. The plats (Appendix C) provide additional details.

Design Features and Best Management Practices

Western will comply with the BLM guidance and standards established in: *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (*The Gold Book*; BLM and U.S. Forest Service [USFS] 2007). Western will adhere to the Stipulations attached to the approved ROW Grant and Notice to Proceed.

Vehicles will be restricted to proposed disturbance areas and existing areas of surface disturbance, such as existing roads and the proposed pipeline corridors. Construction and maintenance activities will cease when soil or road surfaces become saturated to the extent that construction equipment is unable to stay within the proposed project areas and/or when activities will cause irreparable harm to roads, soils, or streams. If equipment creates ruts deeper than six inches due to saturated soil conditions, the soil will be deemed too wet for construction or maintenance. No frozen soils will be used for construction purposes or trench backfilling.

The following general design features and best management practices (BMPs) will occur.

Protection of Air Resources

The BLM's regulatory jurisdiction over field production operations has resulted in the development of BMPs designed to reduce impacts to air quality by reducing all emissions from field production and operations. Typical measures could include reclamation to reduce the amount of dust and watering dirt roads during periods of high use in order to reduce fugitive dust emissions. Magnesium chloride, organic-based compounds, or polymer compounds could be also be applied to roads or other surfaces to reduce fugitive dust. Neither petroleum-based products nor produced water will be used.

Any additional dust-suppression practices will include the BLM-standard BMPs found in *The Gold Book* (BLM and USFS 2007) and the BMPs outlined in the stipulations attached to the approved Notice to Proceed and ROW Grant.

Erosion Control

During reclamation, stockpiled rocks, if available, will be placed within the reclamation area for erosion control and/or OHV control (if requested by the BLM-FFO), and/or in a manner that visually blends with the adjacent, undisturbed landscape.

Within the proposed pipeline corridor, erosion-control features, such as waterbars, will be applied as specified by the BLM-FFO Authorized Officer. If waterbars are constructed, they will follow the horizontal contour of the hillslope on which they will be placed. Spacing requirements (by hillslope grade) are provided in the table below.

Table 2. Waterbar Spacing Requirements by Percent Grade of Hillslope

Hillslope Percent Grade (%)	Waterbar Spacing (feet)
Less than 1	400
1-5	300
5-15	200
15-25	100

During the March 18, 2015 pre-disturbance onsite meeting it was decided the placement of water- and erosion-control features within the proposed project area will be determined during reclamation. Erosion-control features will be applied as specified by the authorized BLM-FFO officer.

Protection of Topsoil

Topsoil, which will be stripped from the surface of the proposed project area during the construction phase of the proposed project, will be stored and protected until it is redistributed during reclamation. The top 6 inches of topsoil will be segregated along the edge of the proposed pipeline corridor; thereby, topsoil will be stored separately from subsoil material. The topsoil will be free of brush, tree limbs, tree stumps, and root balls, but could include chipped or mulched material that is incorporated into the topsoil stockpile. Topsoil will not be stripped when soils are moisture-saturated or frozen below stripping depth. The topsoil will be used during reclamation, as described further below (Reclamation, page 19) and within the proposed project's Reclamation Plan (Appendix E).

Vehicle/equipment traffic will not be allowed to cross topsoil stockpiles.

If the proposed project area shows evidence of wind or water erosion, appropriate measures will be taken to prevent topsoil loss. Such measures could include using tackifiers or water to wet the topsoil stockpile so that a crust is created across the exposed soil.

For the proposed pipeline trench, topsoil will not be used for padding the pipes and will not be mixed with excavated subsoil. Excavated subsoil will be stockpiled separately along the edge of the proposed pipeline corridor. For the proposed pipeline corridor, gaps will be made in topsoil and subsoil stockpiles, where necessary, to avoid ponding or to divert water during storm events.

Protection of Surface Water Resources

The proposed project area crosses 14 ephemeral drainages (USGS blue-lines) including Alamito Arroyo and Escavada Wash. Six of these ephemeral washes were substantial enough in size to conduct wetland delineations and OHWM (ordinary high water mark) delineations to determine potential Waters of the U.S. in accordance with 2010, Updated Datasheet for Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States and the USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0; 2008). These six ephemeral washes are under the jurisdiction of the U.S. Army Corps of Engineers and a determination is underway

as to whether the washes are jurisdictional and may potentially require a Nationwide 12 (Utilities) Permit under Section 404 of the CWA.

Protection of Flora and Fauna, including Special Status Species and Livestock

Because the proposed project will disturb more than four acres of vegetation, if construction activities associated with the proposed project will occur during the migratory bird-breeding season (May 15 through July 31), a migratory bird nest survey of the proposed project area will take place one to two days prior to construction. This survey will be conducted by a BLM-FFO-approved biologist following BLM-FFO protocol. If, during the nest survey or during construction, active nests are located within or adjacent to the proposed project area, the BLM-FFO biologist will be notified and project activities will not be permitted until fledging has occurred. If postponement is not an option, the operator will contact the USFWS's Migratory Bird Permit Office regarding permitting.

The proposed project area is within the BLM-FFO designated habitat "zone" for two BLM SSS: Brack's fishhook cactus and Aztec gilia (BLM 2013a; Figure A.2 [Appendix A]). During the biological field survey, no Aztec gilia were identified within the proposed project area. However, 67 Brack's fishhook cactus individuals were found within the proposed project area. Transplantation of the cacti will follow BLM-FFO guidance that is currently under revision. An annual monitoring report of the transplanted cacti for three years will also be required.

Should any active raptor nests be observed within one-third mile radius of the proposed project area or should any additional SSS (listed by the USFWS or BLM) be observed within the proposed project area prior to or during project implementation, construction will cease and the BLM-FFO will be immediately contacted. The BLM-FFO will then ensure evaluation of the resource. Should a discovery be evaluated as significant (protected under the ESA, etc.), it will be protected in place until mitigation measures could be developed and implemented according to guidelines set by the BLM.

A portion of the project area crosses the one-half mile buffer zone of a golden eagle nest. A pair of golden eagles occupied the nest approximately in mid- March and abandoned the nest in late- April. Timing stipulations will remain in effect and Western will not be allowed to construct within one-half mile of the nest from February 1 through June 30, 2015.

Western will notify the USFWS upon discovery of a dead or injured migratory bird, bald or golden eagle, or USFWS-listed species within or adjacent to the proposed project area. If the BLM becomes aware of such mortality or injury, the BLM-FFO will inform Western. If Western fails to notify the USFWS of the mortality or injury, the BLM-FFO will notify the USFWS. The BLM-FFO and the USFWS will then attempt to determine the cause of mortality and evaluate and identify appropriate mitigation measures to avoid future occurrences.

Livestock grazing operators in the vicinity of the proposed project area will be contacted by Western at least 10 days prior to construction. Any range improvements (such as fences, gates, cattle guards, or waterlines) that could be impacted by the proposed project will be identified and impacts will be mitigated prior to construction. If present, any range improvements (such as fences, gates, cattle guards, or waterlines) disturbed by construction activities will be repaired to the condition they were in prior to disturbance. Repairs/replacement, if needed, will take place immediately following construction.

For the proposed pipeline trench, gaps will be made in topsoil and subsoil stockpiles, where necessary, to allow for wildlife or cattle crossings.

No more than a half mile of trench than can be worked on in a single day will be open at any given time. Trenches will not be left open for more than 24 hours. If a trench is left open overnight, the trench will be fenced or Western will provide a night guard to monitor the open trench and ensure that no livestock or wildlife becomes trapped.

The ends of the proposed pipeline trench will be sloped (3-to-1, horizontal-to-vertical) each night to allow wildlife and livestock to escape. If present, established wildlife or livestock trails will be left in place as

crossovers. Escape ramps or crossovers will be constructed every 1,320 feet within the trench; if active livestock grazing or wildlife are occurring in the proposed project area, these ramps/crossovers will be constructed every 500 feet. The escape ramps/crossovers will be constructed with a minimum 3-to-1 slope at each end. The escape ramps/crossovers will be a minimum of 10 to 12 feet wide and will not be fenced. The ends of the pipes will be plugged to prevent small animals from crawling inside them. Before the trenches are closed, they will be inspected for wildlife and livestock. Any trapped wildlife or livestock will be promptly removed and released at least 150 yards from the trenches.

Prevention and Control of Noxious Weeds and Invasive Species

- A pre-disturbance noxious weed inventory will be conducted to determine the presence of noxious weeds prior to beginning the proposed pipeline, and to determine whether treatment is needed prior to disturbance. If noxious weeds are found, the following will be documented:
- A GPS location recorded in North American Datum 1983,
- Species,
- Canopy cover or number of plants, and
- Size of infestation (estimate of square feet or acres).
- Information will be provided to the FFO BLM Weed Coordinator prior to disturbance, and documented in the annual reclamation report.

The following steps are required under the Farmington Field Office Bare Soil Reclamation Procedures:

During the onsite inspection, the Authorized Officer (AO) and Western's representative(s) will conduct a survey of the proposed pipeline and ancillary facilities to determine if noxious weeds are present. Noxious weeds are those species listed on the New Mexico Department of Agriculture's A and B List (2010) (Weed Fact Sheets are available at: http://weeds.nmsu.edu/). If there are no noxious weeds on the proposed pipeline and ancillary facilities, the AO will indicate that on the standard onsite check list form. If noxious weeds are found, the AO will fill out the Onsite Noxious Weed form. The AO and Western's representative will sign the form, and the AO will submit the completed form to the FFO BLM weed coordinator.

The BLM-FFO weed coordinator will review the form and analyze the noxious weed issues. The BLM-FFO weed coordinator will submit specific requirements and instructions for weed treatments to the operator within 30 days of the onsite. The requirements and instructions will include the time frame of treatment, approved herbicides that may be used, required documentation to be submitted to the BLM-FFO after treatment, and any other site specific instructions that may be applicable. Due to the seasonal nature of effective weed treatment techniques, Western may be required to treat before ground disturbance, or may be required to treat the area after ground disturbance to avoid unreasonable delays.

Control and management of noxious weeds and invasive species infestations will use the principles of integrated weed management including chemical, mechanical, and biological control methods. An approved Pesticide Use Proposal is required for all planned herbicide applications. Herbicides will be applied by a certified applicator. A Biological Use Proposal is required for new biocontrol agents in the Farmington Field Office Administrative Area.

It will be Western's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project area throughout the life of the proposed project. If Western does not hold a current Pesticide Use Permit, a Pesticide Use Proposal will be submitted prior to pesticide application. Only pesticides authorized for use on BLM lands will be used. The use of pesticides will comply with Federal and State laws. Pesticides will be used only in accordance with their registered use and limitations. Western will contact the BLM-FFO prior to using these chemicals.

To minimize the spread of noxious and invasive weeds, Western will use certified weed-free seed for reclamation. Additionally, all equipment will be washed prior to entering the work areas.

Protection of Cultural Resources

All cultural resource stipulations will be followed as indicated in the Cultural Resource Records of Review, attached to the Stipulations in the approved Notice to Proceed and/or ROW Grant. These cultural resource stipulations could include, but will not be limited to, temporary or permanent fencing or other physical barriers, monitoring of earth-disturbing construction, reduction of the proposed project area and/or establishment of specific construction avoidance zones, and employee education.

Employees, contractors, and sub-contractors associated with the proposed project will be informed by Western that cultural sites are to be avoided by personnel, personal vehicles, and company equipment. These individuals will be informed that it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and/or administrative penalties under the provisions of ARPA.

In the event of a cultural discovery during construction, Western will immediately stop all construction activities in the immediate vicinity of the discovery and immediately notify the archaeological monitor, if present, or the BLM-FFO Authorized Officer. The BLM-FFO will then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., eligible for the National Register of Historic Places [NRHP] or protected under NAGPRA or ARPA), it will be protected in place until mitigating measures could be developed and implemented according to guidelines set by the BLM-FFO.

Protection of Paleontological Resources

All paleontological resource stipulations will be followed as indicated in the stipulations attached to the ROW Grant. If a paleontological site is discovered, the BLM-FFO Authorized Officer will be notified and the site will be avoided by personnel, personal vehicles, and company equipment. Workers will be informed that it is illegal to collect, damage, or disturb some such resources, and that such activities are punishable by criminal and/or administrative penalties. During excavation or disturbance, vertebrate fossils may be uncovered, at which point excavation or disturbance in a 50 foot radius of the discovery should halt until the BLM-permitted paleontologist can examine the specimen to determine the appropriate next steps. Western's representative may then be allowed to continue excavation through the site, or would be given the choice of either:

- following the BLM-permitted paleontologist's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or
- following the BLM-permitted paleontologist's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area, which may include halting excavation in the vicinity until the specimen can be safely collected by a BLM-permitted paleontologist.

Due to the existing fossil localities and the new Nacimiento Formation localities discovered during paleontological field survey, monitoring by a paleontologist during surface disturbance of Nacimiento Formation will be required. Monitoring is specifically required within Secs. 27, 32, 33, and 34, of T. 23N., R. 7 W. Monitoring will not be required within Sec. 5, T. 22 N., R 8 W., where no new paleontological localities were found and no previously existing localities are known within one mile of the project area. Where the project crosses San Jose Formation within Sec. 27, T.23N., R.7W., monitoring will not be required due to the lack of known fossil localities in the area.

Additionally, the turtle carapace at Field Locality JHB 1501 must be collected by a qualified paleontologist prior to surface disturbance Specific requirements of this collection are detailed in Appendix F. A Paleontological Resource Survey for the Western Refining Lybrook West Pipeline 10-Inch Crude Oil Pipeline Alignment Sections 27, 32, 33, and 34, T.23N., R.7W., Section 5, T.22N., R.8W., Sandoval County and San Juan County, New Mexico.

Travel and Transportation

The hauling of equipment and materials on public roads will comply with New Mexico Department of Transportation (NMDOT) and county regulations. NMDOT permits for oversize and overweight loads will

be obtained. Encroachment permits to cross Federal-Aid Highways under authority of 23 U.S.C. 116, 123, 315; 23 CFR. 645, Subpart B will also be obtained, if needed. Pilot (flag) vehicles will be utilized as required. As required by the various county codes, Western will obtain county road crossing permits and permits for oversized and other "out of the ordinary traffic" activities taking place within county road right-of-ways. Western will take care to maintain and avenue for vehicular passage on all county roads and private or oilfield roads crossed by pipeline trenching, including County roads 77900 and 7950 that provide access to Chaco Culture National Historic Park.

County roads, private roads, and oilfield roads associated with the project will be returned/maintained in better condition than existed prior to the commencement of construction/operations, including County Roads 77900 and 7950. Heavy traffic asphalt surfaced roads, will be returned/maintained in better condition than existed prior to the commencement of construction/operations. Any road, asphalt or road shoulder damage as a result of the three proposed road bores will be repaired to County standards.

Where pipeline construction parallels or crosses public roads, warning signs will be placed to alert motorists of construction. Safety measures will also be implemented along the construction workspace by either using the topsoil or subsoil piles or strung pipe as a barrier to possibly unintentional traffic. Trenches left open at road crossings will be fenced with orange safety fence and barricades will be installed, if needed. During construction, access to the pipeline construction corridor will be limited to pipeline construction crews.

Any accidents involving persons or property will immediately be reported to the BLM-FFO. Western will notify the public of potential hazards by posting signage (e.g., trucks turning or construction ahead), having flaggers, or using lighted signs, as necessary.

Protection of the Public

The hauling of equipment and materials on public roads will comply with the New Mexico Department of Transportation (NMDOT) regulations and county road requirements. Any accidents involving persons or property will immediately be reported to the BLM-FFO. Western will notify the public of potential hazards by posting signage (e.g., trucks turning or construction ahead), having flaggers, or using lighted signs, as necessary. Orange flagging and barriers will be put in place to restrict public access to the work site. All roadway speed limits will be observed.

Worker safety incidents will be reported to the BLM-FFO as required. Western will adhere to company safety policies and Occupational Safety and Health Administration (OSHA) regulations. Western will comply with pipeline safety regulations (49 CFR 190 and 192). The proposed pipeline trench will be excavated and sloped in accordance with OSHA specifications.

The soil stockpiles and pipe string will also be used as safety barriers during construction of the proposed pipeline. If a pipeline trench is left open at a road crossing, orange safety fencing or barricades will be installed, if needed. During construction, access to the proposed pipeline corridor will be limited to pipeline construction crews.

Control of Waste

Liquid and solid wastes will be disposed of at an appropriate waste-disposal site. The proposed project area will be maintained in a sanitary condition. Hazardous substances will be handled and disposed of according to Federal law. Waste resulting from construction activities will be removed from the proposed project areas and disposed of in an authorized area, such as federal, state, or county approved landfill.

Proposed Project Phases

During all project phases, vehicles would use the developed BLM roads and highways in the region. Traffic would include light vehicles (such as cars and pick-up trucks) and heavy vehicles (such as water trucks and large tractor-trailers hauling equipment and pipe).

Refer to the section above (Design Features and Best Management Practices) for resource-protection details associated with all proposed project phases.

Under the proposed action, the following phases would occur.

Construction of Pipeline Corridor

A pipeline would be constructed and installed to carry crude oil from the Western Refining facilities located adjacent to highway 550 to Western's 16-inch (Formerly the TexNew Mexico pipeline. The lifetime of a pipeline is anticipated to be 30 to 50 years. Pipeline construction would take approximately 3 and one half months for the proposed project to be completed.

The proposed pipeline would be a 10-inch-outer diameter steel pipe. The pipeline ROW corridor would be 50 feet in width on BLM- and Fee-managed surface and 30 feet in width on State-managed surfaces. The length of the proposed pipeline is 73,722-feet (13.96 miles).

The maximum operating pressure (MOP) of the proposed pipeline would be 1,480 pounds per square inch gauge. Additional, related aboveground appurtenances (i.e., cathodic protection equipment, block valves, control valves, etc.) would be installed within the proposed pipeline corridor.

For the proposed pipeline, site preparation would include clearing vegetation from the proposed corridor, salvaging and stockpiling topsoil, and excavating the pipe trench. The site preparation activities would be limited to the minimum area required for safe and efficient construction but would not exceed the widths of the ROW as granted by federal, state, and the fee owner.

The proposed pipeline would be cleared of vegetation and leveled. Vegetation removed during construction, including trees that measure less than three inches in diameter (at ground level) and slash/brush, would be chipped, shredded, or mulched and incorporated into topsoil for later use in interim reclamation. When chipping slash and brush, the "chips" would be distributed in a manner that would not impede seeding with machinery or the establishment of successful revegetation. If any trees three inches in diameter or greater (at ground level) are present, they would be cut to ground level and de-limbed. Tree trunks (left whole) and cut limbs would be placed in a manner that would not create additional disturbance or degrade reclamation. Approximately 250 to 350 trees would be removed as a result of the proposed project.

Topsoil would be stockpiled along the edge of the proposed pipeline corridor. Trees cleared from the proposed corridor would be stacked along the proposed pipeline corridor; the tree limbs could also be stockpiled for use during reclamation. Tree stumps and root balls would be cut to ground level and would be buried within the corresponding proposed project area.

For the proposed pipe trench, the cover from the top of the pipe to ground level would be a minimum of 48 inches deep when located within typically encountered soil and rock, a minimum of 60 inches deep at road crossings and bar ditches, and 72 inches of cover in washes (drainages). Where rock is encountered within the pipe trench, tractor-mounted mechanical rippers or rock trenching equipment could be used during trenching excavation activities.

Proposed pipeline construction and installation would include stringing the pipe, bending the pipe for horizontal or vertical angles in the pipeline alignment, welding pipeline segments together, inspecting the pipe, coating the pipe to prevent corrosion, and lowering the pipe into the trench. The pipe inspection would include the verification that the minimum pipe cover has been provided, the trench bottom is free of rocks/debris, the external pipe coating has not been damaged, and the pipe has been properly fitted and installed in the trench. The fine soil would be sifted from the subsoil stockpile in order to provide rock-free pipeline padding and bedding. In rocky areas, a padding material or rock shield would be used to protect the pipe. After a section of pipe has been lowered into the pipeline trench and inspected, the pipeline trench would be backfilled. Once the pipeline trench has been backfilled, cleanup activities would be initiated and reclamation would take place within the workspace, as described in the following section (Reclamation) and within the proposed project Reclamation Plan (Appendix E).

Additional resource-protection design features and mitigation associated with construction are listed above, in "Design Features and Best Management Practices".

Reclamation

Reclamation would occur concurrently with or following construction. Any locations within the proposed project area that have experienced surface disturbance would be seeded with a BLM-FFO-designated, certified weed-free seed mixture (or, if specified on non-BLM lands, a seed mixture specified by the land manager). Reclamation would take approximately one to two weeks for the proposed pipeline corridor. The BLM-FFO would be notified at least 48 hours prior to the start of reclamation activities at each location.

During reclamation, the following equipment could be utilized onsite: pick-up trucks, dozers, blades, track and back-hoes, farm tractor with a disc, and scraper.

In areas that would be reclaimed within the proposed project area, slopes would be contoured to pre-construction topographical contours, if possible. Western would diminish the evidence of cuts, fills, and flat surfaces.

Water- and erosion-control features would be installed within the proposed project area as described in "Design Features and Best Management Practices – Erosion Control." Additional water diversions, if needed, would be installed at this time.

Reclaimed areas would be seeded using the Sagebrush/Grass, Piñon-Juniper, and Badland Vegetation Community Seed Mixtures.

The reclamation standards would comply with BLM-FFO Bare Soil Reclamation Procedure (BLM 2013b). Details of the interim reclamation process are provided in the Reclamation Plan (Appendix E).

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013b), Western would monitor reclaimed surfaces to document successful interim reclamation; monitoring and reporting are discussed in the Reclamation Plan (Appendix E).

Operation

During the operation phase of the proposed project, Western personnel would perform routine or emergency maintenance on the proposed pipeline and associated facilities. Although the frequency of visits to the proposed pipeline would depend on the amount of liquids (crude oil) produced by existing wells in the vicinity, it is anticipated that Western personnel would travel to the proposed pipeline at least one time per week.

Final Abandonment

When the proposed pipeline would no longer be necessary and would not be expected to be utilized in the foreseeable future, it would be abandoned. Abandonment would be carried out under current BLM regulations. All surface facilities would be removed and the proposed pipeline would be removed or abandon-in-place. The permitted ROW would be utilized as access during this process

Reclaimed areas would be seeded using the Sagebrush/Grass, Piñon-Juniper, and Badland Vegetation Community Seed Mixtures.

Reclamation standards would comply with BLM-FFO Bare Soil Reclamation Procedure (BLM 2013b). Details of the interim reclamation process are provided in the reclamation plan (Appendix E).

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013b), Western would monitor reclaimed surfaces to document successful reclamation; monitoring and reporting are discussed in the Reclamation Plan (Appendix E).

2.2.3. Proposed Surface Disturbance

The proposed project would result in approximately 88.6 acres of total surface disturbance, including BLM-FFO-, State-, and Fee-managed surface. Of this, 79.4 acres would be on BLM-FFO-managed surface, 4.9 acres would be on State-managed surface, and 4.3 acres would be on Fee-managed surface. Of this, 64.3 acres would be considered new surface disturbance, including BLM-FFO-, State-, and Fee-managed surface. All portions of the project area would be reclaimed after construction. Project features are summarized in the table below and described in detail in the sub-sections below.

Table 3. Surface Disturbance Associated with Proposed Project

Feature	Acreage						Description of New Disturbance Acreage Following Reclamation		
	Total			New Disturbance			Fully Reclaimed (Reseeded and Recontoured)		
	BLM	State	Fee	BLM	State	Fee	BLM	State	Fee
Pipeline Corridor	74.1	3.7	4.3	52.9	1.9	3.0	52.9	1.9	3.0
TUA # 1	0.2	-	-	0.2	-	-	0.2	-	-
TUA # 2	0.5	-	-	0.5	-	-	0.5	-	-
TUA # 3	0.5	-	-	0.5	-	-	0.5	-	-
TUA # 4	0.2	-	-	0.2	-	-	0.2	-	-
TUA # 5	1.8	-	-	1.8	-	-	1.8	-	-
TUA # 6	0.2	-	-	0.2	-	-	0.2	-	-
TUA # 7	0.3	-	-	0.3	-	-	0.3	-	-
TUA # 8	0.3	-	-	0.3	-	-	0.3	-	-
TUA # 9	-	1.0	-	-	1.0	-	-	1.0	-
TUA # 10	-	0.2	-	-	0.2	-	-	0.2	-
TUA # 11	0.2	-	-	0.2	-	-	0.2	-	-
TUA # 12	0.3	-	-	0.3	-	-	0.3	-	-
TUA # 13	0.3	-	-	0.3	-	-	0.3	-	-
TUA # 14	0.2	-	-	0.2	-	-	0.2	-	-
TUA # 15	0.1	-	-	0.1	-	-	0.1	-	-
TUA # 16	0.1	-	-	0.1	-	-	0.1	-	-
TUA # 17	0.1	-	-	0.1	-	-	0.1	-	-
Total	**79.4**	**4.9**	**4.3**	**58.2**	**3.1**	**3.0**	**58.2**	**3.1**	**3.0**
Total	**88.6**			**64.3**			**64.3**		

Pipeline Corridor

The pipeline corridor would be 73,722 feet long and 50 feet wide on Fee- and BLM-managed surface, and 30 feet wide on State-managed surface, excluding TUAs (82.1 total acres): 74.1 acres on BLM-managed surface, 3.7 acres on State-managed surface, and 4.3 acres on Fee-managed surface). Approximately 61,802 feet (approximately 49.7 acres) of the proposed pipeline corridor would travel parallel and adjacent to existing disturbance. Where the proposed pipeline corridor parallels existing disturbance, approximately 15 feet of the proposed pipeline corridor would overlap existing disturbance. The remainder of the proposed pipeline corridor, 2,789 feet (3.2 acres) from approximate stationing 198+90 to 171+01 would not parallel existing disturbance and would be considered all new surface disturbance (using the 50-foot wide ROW corridor). Therefore, new surface disturbance associated with the proposed pipeline corridor would be 57.8 acres total (52.9 acres on BLM-managed surface, 1.9 acres on State-

managed surface, and 3.0 acres on Fee-managed surface). All of this disturbance would be fully reclaimed during reclamation.

TUAs

Seventeen proposed TUAs (6.5 acre, total; 5.3 acres would be on BLM-managed surface and 1.2 acres would be on State-managed surface) would be associated with the proposed pipeline corridor (described below). The proposed TUAs would be fully reclaimed during reclamation.

- TUA No. 1: A 25-by-400-foot (0.2-acre) TUA would be located on BLM-Managed surface from station 3+15 to 7+15 of the proposed pipeline corridor.
- TUA No. 2: A 100-by-200-foot (0.5-acre) TUA would be located on BLM-Managed surface from station 12+15 to 14+15 of the proposed pipeline corridor.
- TUA No. 3: A 100-by-200-foot (0.5-acre) TUA would be located on BLM-Managed surface from station 21+15 to 23+15 of the proposed pipeline corridor.
- TUA No. 4: A 25-by-410-foot (0.2-acre) TUA would be located on BLM-Managed surface from station 51+16 to 55+26 of the proposed pipeline corridor.
- TUA No. 5: A 50-by-1,539-foot (1.8 acre) TUA would be located on BLM-Managed surface from station 173+61 to 189+00 of the proposed pipeline corridor.
- TUA No. 6: A 25-by-400-foot (0.2-acre) TUA would be located on BLM-managed surface from station 237+00 to 241+00 of the proposed pipeline corridor.
- TUA No. 7: A 25-by-536-foot (0.3 acre) TUA would be located on BLM-managed surface from station 256+03 to 261+39 of the proposed pipeline corridor.
- TUA No. 8: A 25-by-569-foot (0.3-acre) TUA would be located on BLM-managed surface from station 282+84 to 288+53 of the proposed corridor.
- TUA No. 9: A 25-by-1758-foot (1.0 acre) TUA would be located on State-managed surface from station 298+13 to 315+71 of the proposed pipeline corridor.
- TUA No. 10: A 25-by-293-foot (0.2-acre) TUA would be located on State-managed surface from station 331+21 to 334+14 of the proposed pipeline corridor.
- TUA No. 11: A 25-by-300-foot (0.2 acre) TUA would be located on BLM-Managed surface from station 517+13 to 520+13 of the proposed pipeline corridor.
- TUA No. 12: A 75-by-200-foot (0.3-acre) TUA would be located on BLM-managed surface from station 564+14 to 566+14 of the proposed pipeline corridor.
- TUA No. 13: A 75-by-200-foot (0.3 acre) TUA would be located on BLM-managed surface from station 567+64 to off ROW of the proposed pipeline corridor.
- TUA No. 14: A 75-by-125-foot (0.2-acre) TUA would be located on BLM-managed surface from station 642+73 to off ROW of the proposed pipeline corridor.
- TUA No. 15: A 25-by-125-foot (0.1 acre) TUA would be located on BLM-Managed surface from station 644+00 to 645+25 of the proposed pipeline corridor.
- TUA No. 16: A 25-by-144-foot (0.1-acre) TUA would be located on BLM-managed surface from station 718+31 to 719+76 of the proposed pipeline corridor.
- TUA No. 17: A 25-by-125-foot (0.1 acre) TUA would be located on BLM-managed surface from station 721+00 to 722+25 of the proposed pipeline corridor.

2.3. Alternatives Considered but Eliminated from Detailed Study

A reasonable alternative to the proposed action achieves the purpose of and satisfies the need for the proposed action. The proposed pipeline follows the most economic and direct route based on the Western facility location, Western's existing 16-inch pipeline (formerly the TexNew Mexico pipeline), power source, existing disturbance, surface resources, and terrain.

One additional alternative was identified to upgrade the existing road. However, in order to abide by the *The Gold Book* for upgrading the existing road, there was limited space available for the additional proposed pipeline (BLM and USFS 2007). This alternative would create fewer disturbances while fulfilling the purpose and need of the proposed action; however, the alternative would have required a

subterranean bore of a large section of the proposed pipeline that was deemed not to be feasible from an economic and construction perspective.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environment that would be affected by implementation of the alternatives described in Chapter 2. Aspects of the affected environment described in this section focus on the relevant major resources and issues.

The No Action Alternative reflects the current situation within the project area and would serve as the baseline for comparing the environmental impacts of the analyzed alternatives. Under the No Action Alternative, the proposed pipeline would not be implemented. The No Action Alternative would result in the continuation of the current land and resource uses in the area. This alternative will not be evaluated further in this EA.

Field resource investigations of the proposed pipeline areas were conducted on February 11, 12, 14, 26, 2015; March 12, 14, 17, 18, and 27, 2015; and April 08, 2015 Nelson Consulting, Inc. biologists. Cultural resource surveys were conducted by La Plata Archaeological Consultants (LAC) on various dates between February 18 and June 1, 2015 and Western Cultural Resource Management, Inc. (WCRM) on various dates between April 9 and May 6, 2015.

3.1. Methodology

3.1.1. Direct and Indirect Impacts

Direct and indirect impacts are described as direct, indirect, short-term and long-term. Direct impacts include those occurring during the implementation of the action. Indirect impacts are caused by the action but occur later in time or farther removed in distance. Short-term impacts include those occurring during construction and drilling activities or those that are mitigated (i.e., reclamation of disturbed areas) within five years following construction. Long-term impacts include those that exist throughout or beyond the life of the project, through abandonment and reclamation.

3.1.2. Cumulative Impacts

A Reasonably Foreseeable Development scenario (RFD) was prepared for the BLM-FFO in October 2014 (Engler, et al., 2014). The RFD identified high, moderate, and low potential regions for oil development of the Mancos-Gallup Formation. Within the high potential region, full development would include 5 wells per section, resulting in 1,600 completions. Within the moderate potential region, full development would include one well per section, resulting in 330 completions. Within the low potential region, full development would include one well per township, resulting in 30 well completions. Additionally, the RFD predicted 2,000 gas wells could be development in the northeastern corner of the BLM-FFO.

The following methods and assumptions were used to predict the potential impact of the development predicted in the RFD.

Past Oil and Gas Development

Past oil and gas wells were identified using The State of New Mexico Ongard data system (http://web.ongard.state.nm.us/Home/). Following interim reclamation, the average wellpad size for past development is 0.75 acres per wellpad.

Present and Future Oil Development

Based on previous development, it was assumed that development of the high potential region would involve the twinning of wellpads. This is the placement of two or more wells on one wellpad. The assumption for the analysis is that the development of a section would include two twinned wellpads and one single wellpad, resulting in three wellpads for five wells. In the moderate and low potential regions, it was assumed that development would involve single wellpads. The proposed action is located within the low potential region (Engler et.al. 2014).

The average wellpad size for a twinned wellpad was assumed to be 500 feet by 530 feet, or 6.08 acres. An additional 0.6 acres was added to account for any associated road or pipeline development, resulting 6.68 acres of short-term disturbance. Following completion of the well, interim reclamation of the wellpad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The average wellpad size for a single wellpad was assumed to be 500 feet by 500 feet, or 5.74 acres. Again, an additional 0.6 acres was added to account for associated road or pipeline development, resulting in 6.34 acres of long-term disturbance. Following completion of the well, interim reclamation of the wellpad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The Random Point Tool in ArcMap was used to randomly assign points representing wellpads and associated disturbance based on the RFD assumptions: five wells per section in the high potential region, one well per section in the moderate potential region, and one well per township in the low potential region. The allowed both long-term and short-term disturbance from oil development of the Mancos-Gallup Formation to be calculated for the analysis areas used in this EA.

Present and Future Gas Development

The RFD predicted 2,000 wells could be developed in the gas prone area. The average wellpad size was assumed to be 555 feet by 410 feet, or 5.22 acres. An additional 0.6 acres of disturbance was added to account for associated roads and pipelines, resulting in total disturbance of 5.82 acres. Following completion of the well, interim reclamation of the wellpad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The Random Point Tool in ArcMap was used to randomly assign points representing one wellpad and associated disturbance. The allowed both long-term and short-term disturbance from gas development in the northeastern corner of the BLM-FFO to be calculated for the analysis areas used in this EA.

3.2. Air Resources

3.2.1. Affected Environment

The proposed project area is located in Rio Arriba, Sandoval, and San Juan Counties, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the BLM-FFO PRMP/FEIS (BLM 2003a, 3-48 – 3-53). In addition, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this document was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO_2) methane (CH_4); nitrous oxide (N_2O); water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Resources Technical Report; BLM 2014a). This document summarizes the technical information

related to air resources and climate change associated with oil and gas development and the methodology and assumptions used for analysis.

The EPA has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb). EPA has established NAAQS for criteria air pollutants. The NAAQS are protective of human health and the environment. EPA has approved New Mexico's State Implementation Plan and the state enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands and within Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. EPA has proposed or completed actions recently to implement CAA requirements for GHG emissions. Climate has the potential to influence renewable and non-renewable resource management.

Air Quality

Criteria Air Pollutants

The Air Resources Technical Report describes the types of data used for description of the existing conditions of criteria pollutants, how the criteria pollutants are related to the activities involved in oil and gas development, and provides a table of current National and state standards. EPA's Green Book web page (EPA 2013b) reports that all counties in the Farmington Field Office area are in attainment of all NAAQS as defined by the CAA. The area is also in attainment of all New Mexico Ambient Air Quality Standards (NMAAQS). The current status of criteria pollutant levels in the BLM-FFO are described below.

"Design Values" are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2012 design values for criteria pollutants are listed below in Table 4. 2012 Criteria Pollutant Monitored Values in San Juan County. There is no monitoring for CO and lead in San Juan County, but because the county is relatively rural, it is likely that these pollutants are not elevated. PM10 design concentrations are not available for San Juan County.

Table 4. 2012 Criteria Pollutant Monitored Values in San Juan County

Pollutant	2012 Design Concentration	Averaging Time	NAAQS	NMAAQS
O_3	0.071 ppm	8-hour	0.075 ppm[1]	
NO_2	13 ppb	Annual	53 ppb[2]	50 ppb
NO_2	38 ppb	1-hour	100 ppb[3]	
$PM_{2.5}$	4.7 µg/m^3	Annual	12 µg/m^3[3,4]	60 µg/m^3[3,6]
$PM_{2.5}$	14 µg/m^3	24 hour	35 µg/m^3[3,5]	150 µg/m^3[3,6]
SO_2	19 ppb	1-hour	75 ppb[5]	

Source: EPA 2014a
[1] Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
[2] Not to be exceeded during the year
[3] 98th percentile, averaged over 3 years
[4] Annual mean, averaged over 3 years
[5] 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
[6] The NMAAQS is for Total Suspended Particulate (TSP)

In 2005, the EPA estimates that there was less than 0.01 ton per square mile of lead emitted in BLM-FFO counties, which is less than 2 tons total (EPA 2012). Lead emissions are not an issue in this area, and will not be discussed further.

Air quality in a given region can be measured by its Air Quality Index value. The air quality index (AQI) is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and

all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (AQI<50), moderate (50-100), unhealthy for sensitive groups (100-150), unhealthy (>150), very unhealthy and hazardous. The AQI is a national index, the air quality rating and the associated level of health concern is the same everywhere in the country. The AQI is an important indicator for populations sensitive to air quality changes.

Mean AQI values for San Juan County were generally in the good range (AQI<50) in 2013 with 80% of the days in that range. The median AQI in 2013 was 42, which indicates "good" air quality. The maximum AQI in 2013 was 156, which is "unhealthy".

Although the AQI in the region has reached the level considered unhealthy for sensitive groups on several days almost every year in the last decade, there are no patterns or trends to the occurrences as seen in the table below. On 8 days in the past decade, air quality has reached the level of "unhealthy" and on two days, air quality reached the level of "very unhealthy". In 2009 and 2012, there were no days that were "unhealthy for sensitive groups" or worse in air quality. In 2005 and 2013, there was one day that was "unhealthy" during each year. In 2010, there were five "unhealthy" days and two "very unhealthy days".

Table 5. Number of days classified as "unhealthy for sensitive groups" (AQI 101-150) or worse

ear	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Days	3	6	9	18	1	0	12	9	0	1
Source: EPA 2013a										

Hazardous Air Pollutants

The Air Resources Technical Report discusses the relevance of hazardous air pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (BLM 2014a). The EPA conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the U.S. The purpose of the NATA is to identify areas where HAP emissions result in high health risks and further emissions reduction strategies are necessary. A review of the results of the 2005 NATA shows that cancer, neurological and respiratory risks in San Juan County are generally lower than statewide and national levels as well as those for Bernalillo County where urban sources are concentrated in the Albuquerque area (EPA 2012).

Climate

The analysis area is located in a semiarid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the range of 80 or 90 degrees Fahrenheit (°F), and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above 100°F in June and July and have dipped below zero in December and January. Precipitation is divided between summer thunderstorms associated with the southwest monsoon and winter snowfall as Pacific weather systems drop south into New Mexico. The table below shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 6. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (°F)	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Precipitation (inches)
January	30.5	40.8	20.3	0.53
February	35.8	46.8	24.8	0.59
March	43.2	56.1	30.3	0.78
April	50.4	64.7	36.2	0.65
May	60.4	74.8	46.1	0.54
June	69.8	85.1	54.5	0.21
July	75.4	89.6	61.2	0.90

Month	Average Temperature (°F)	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Precipitation (inches)
August	73.2	86.5	59.8	1.26
September	65.4	79.1	51.7	1.04
October	53.3	66.4	40.1	0.91
November	40.5	52.2	28.8	0.68
December	31.0	41.2	20.7	0.50
Source: data collected at New Mexico State Agricultural Science Center - Farmington				

Very recently, pioneering research using space-borne (satellite and aircraft) determination of methane concentrations have indicated anomalously large methane concentrations may occur in the Four Corners region (Kort et al. 2014). A subsequent study by Schneising et al. (2014) indicated larger anomalies over other oil and gas basins in the U.S. Methane is 34 times more potent at trapping GHG emissions than CO2 when considering a time horizon of 100 years (Intergovernmental Panel on Climate Change 2013). While space-borne studies can determine the pollutant concentration in a column of air, these studies cannot pinpoint the specific sources of air pollution. Further study is required to determine the sources responsible for methane concentrations in the Four Corners region; however, it is known that a significant amount of methane is emitted during oil and gas well completion (Howarth et al. 2011). Methane is also emitted from process equipment, such as pneumatic controllers and liquids unloading, at oil and gas production sites. Ground-based, direct source monitoring of pneumatic controllers conducted by the Center for Energy and Environmental Resources show that methane emissions from controllers exhibit a wide range of emissions and a small subset of pneumatic controllers emitted more methane than most (Allen et al. 2014a). Emissions measured in the study varied significantly by region of the U.S., the application of the controller and whether the controller was continuous or intermittently venting. The Center for Energy and Environmental Resources had similar findings of variability of methane emissions from liquid unloading (Allen et al. 2014b). In October 2012, EPA promulgated air quality regulations controlling volatile organic compound (VOC) emissions at gas wells. These rules require air pollution mitigation measures that reduce the emissions of VOCs. These same mitigation measures have a co-benefit of reducing methane emissions. Future ground-based and space-borne studies planned in the Four Corners region with emerging pollutant measurement technology may help to pinpoint significant, specific sources of methane emissions in the region.

The Air Resources Technical Report summarizes information about GHG greenhouse gas emissions from oil and gas development and their effects on national and global climate conditions. While it is difficult to determine the spatial and temporal variability and change of climatic conditions, increasing concentrations of GHGs are likely to accelerate the rate of climate change.

3.2.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Air quality would temporarily be directly impacted with pollution from exhaust emissions and dust. Air pollution from the motorized equipment and dust dissemination would discontinue at the completion of the project. Other factors that currently affect air quality in the area include dust from livestock herding activities, dust from recreational use, dust from use of roads for vehicular traffic, and emissions from oil and gas production activities. Impacts to air quality attributable to this project would be temporary and minor.

Cumulative Impacts

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries, and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (BLM 2014a). It includes a summary of emissions on the national and regional scale by industry source.

Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

The proposed project could result in a small direct and indirect increase in several criteria pollutants, HAPs, and GHGs as a result the short term construction activity. The small increase in emissions from short term construction activity would not be expected to result in exceeding the NAAQS for any criteria pollutants in the analysis area.

The small increase in GHG emissions that could result from implementing the proposed alternative would not produce climate change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the action alternatives cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the action alternatives on global or regional climate.

The Air Resources Technical Report (BLM 2014a) discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

3.3. Soils

3.3.1. Affected Environment

Surface geology in the proposed project area is underlain by the Paleocene Nacimiento and San Jose formations (New Mexico Bureau of Geology and Mineral Resources 2003). The San Jose Formation is composed of fine-grained, well-sorted, sub-rounded, cross-bedded quartz sandstone with calcite and hematite cements. Some of the sandstone is very friable; in other exposures the sandstone is well-cemented. Some iron oxide concretions exist in the sandstone. Tan, gray, and orange mudrocks are also abundant in the San Jose Formation. The bedrock is covered with a soil layer and sagebrush at the northernmost portion of the proposed pipeline on top of a mesa, and outcrops are exposed along an escarpment to the south (Burris and Heil 2015).

Soils in the proposed project area have a varied susceptibility to water and wind erosion. Within the majority of the proposed project area, current vegetative ground cover helps to prevent soil erosion, thereby reducing the amount of sedimentation flowing into drainages during wind and precipitation events. Seven mapped soil types occur across the proposed pipeline area, the Badland Map Unit, Blancot-Councelor-Tsosie association (0- to 5-percent slopes), Blancot-Notal Association (gently sloping), Doak-Sheppard-Shiprock association (rolling), Fruitland-Persayo-Sheppard complex (hilly slopes), Rock outcrop-Vessilla-Menefee complex (15- to 45-percent slopes), and Vessilla-Menefee-Orlie association (0- to 33- percent slopes; USDI NRCS 2015). The different soil types are described further below.

Rio Arriba County

Privaetes-Florita complex (2- to 10-percent slopes)

This soil association comprises approximately 1.9 acres of the proposed pipeline corridor and TUAs No. 16 and No. 17. It is composed of Pinavetes and similar soils, 40 percent is composed of Florita and similar soils, and 10 percent is made up of minor soil components. This soil association is considered a well-drained to excessively drained soil with a low potential for water erosion and very high potential for wind erosion. The potential plant community for this soil complex is usually comprised of western wheatgrass (*Pascopyrum smithii*), galleta (*Pleuraphis* spp.), muttongrass (*Poa fendleriana*), bluestem (*Andropogon* spp.), Indian ricegrass (*Achnatherum hymenoides*), sand sagebrush (*Artemisia filifolia*), piñon pine (*Pinus edulis*), and oneseed juniper (*Juniperus monosperma*) (NRCS 2008).

Vessilla-Menefee-Orlie complex (1- to 30- percent slopes)

This soil association comprises approximately 3.5 acres of the proposed pipeline corridor and TUA No. 15. It is composed of approximately 45 percent Vessilla and similar soils, 25 percent is composed of Menefee and similar soils, 20 percent is composed of Orlie and similar soils, and 10 percent is made up of minor soil components. This soil association is considered a well-drained soil with a low potential for water erosion and a low to high potential for wind erosion. The potential plant community for this soil complex is usually comprised of western wheatgrass, James' galleta (*Pleuraphis jamesii*), Indian ricegrass, needle and thread (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), big sagebrush (*Artemisia tridentata*), fourwing saltbush (*Atriplex canescens*), piñon pine, oneseed juniper, and Gambel oak (*Quercus gambellii*) (NRCS 2008).

Sandoval County

Badland

This soil association comprises approximately 23.7 acres of the proposed pipeline corridor and TUAs Nos. 9, 10, 11, 12, and 13. It is composed of approximately 35 percent Badland, 30 percent Rock outcrop, and 20 percent Persayo and similar soils. This soil complex has a low to moderate potential for water erosion and low potential for wind erosion (NRCS 2009).

The depth to restrictive layer for the Rock outcrop map unit is zero inches to lithic bedrock. Available water capacity for this map unit is very low (zero inches). Rock outcrops associated with this soil complex are found along slopes ranging from 40 to 70 percent. A typical profile for the Rock outcrop map unit is bedrock from 0 to 60 inches (NRCS 2009). The potential plant community for this soil type is usually comprised of James' galleta, alkali sacaton (*Sporobolus airoides*), blue grama, black grama (*Bouteloua eriopoda),* sideoats grama (*Bouteloua curtipendula*), piñon pine, and juniper (*Juniperus* spp.; NRCS 2009).

Blancot-Councelor-Tsosie association (0- to 5-percent slopes)

This soil association comprises approximately 5.5 acres of the proposed pipeline corridor and TUA No. 8. It is composed of approximately 40 percent Blancot soils, 30 percent Councelor soils, and 25 percent Tsosie soils. This soil association is considered a well-drained soil with a moderate potential for water erosion and a very high potential for wind erosion. The potential plant community for this soil complex is usually comprised of James' galleta, Indian ricegrass, needle and thread, New Mexico feathergrass (*Hesperostipa neomexicana*), inland saltgrass (*Distichlis spicata*),western wheatgrass, squirreltail (*Elymus elymoides*), blue grama, dropseed (*Sporobolus* spp.), alkali sacaton, winterfat (*Krascheninnikovia lanata*), big sagebrush, Mormon tea (*Ephedra viridis*), greasewood (*Sacrobatus* spp.), shadscale saltbush (*Atriplex confertifolia*), and fourwing saltbush (NRCS 2008).

Rock outcrop-Vessilla-Menefee complex (15- to 45-percent slopes)

This soil association comprises approximately 5.2 acres of the proposed pipeline corridor and TUA No. 14. It is composed of Vessilla and similar soils, 20 percent is composed of Menefee and similar soils, and 10 percent is made up of minor soil components. This soil association has a high to very high runoff classification and a moderate to high potential for wind erosion. The potential plant community for this soil complex is usually comprised of blue grama, sideoats grama, big sagebrush, piñon pine, oneseed juniper, and Gambel oak (NRCS 2008).

Vessilla-Menefee-Orlie association (0- to 33- percent slopes)

This soil association comprises approximately 6.6 acres of the proposed pipeline corridor. It is composed of approximately 35 percent Vessilla and similar soils, 30 percent Menefee and similar soils, and 25 percent Orlie and similar soils. This soil is considered a well-drained soil with a high potential for water erosion and a very high potential for wind erosion. The potential plant community for this soil complex is usually comprised piñon pine, skunkbush sumac (*Rhus trilobata*), blue grama, and piñon pine, oneseed juniper, and Gambel oak (NRCS 2008).

San Juan County

Badland

This soil association comprises approximately 2.2 acres of the proposed pipeline corridor. This soil association is composed of approximately 35 percent Badland, 30 percent Rock outcrop, and 20 percent Persayo and similar soils. This soil complex has a low to moderate potential for water erosion and low potential for wind erosion (NRCS 2009).

The depth to restrictive layer for the Rock outcrop map unit is zero inches to lithic bedrock. Available water capacity for this map unit is very low (zero inches). Rock outcrops associated with this soil complex are found along slopes ranging from 40 to 70 percent. A typical profile for the Rock outcrop map unit is bedrock from 0 to 60 inches (NRCS 2009). The potential plant community for this soil type is usually comprised of James' galleta, alkali sacaton, blue grama, black grama, sideoats grama, piñon pine, and juniper (NRCS 2009).

Blancot-Notal association (gently sloping)

This soil association comprises approximately 3.3 acres of the proposed pipeline corridor. It is composed of 55 percent Blancot and similar soils and 25 percent Notal and similar soils. This soil association is considered a well-drained soil with a moderate to high potential for water erosion and low to moderate potential for wind erosion. The Blancot-Notal association (gently sloping) is typically found along fan remnant and stream terrace landforms (0- to 5-percent slopes) and within loamy and salt flat ecological sites. The potential plant community for this soil complex is usually comprised of James' galleta, Indian ricegrass, western wheatgrass, needle and thread, blue grama, New Mexico feathergrass, squirreltail, inland saltgrass, dropseed, threeawn (*Aristida* spp.), alkali sacaton, black greasewood, fourwing saltbush, shadscale saltbush, broom snakeweed (*Gutierrezia sarothrae*), winterfat, sagebrush, rabbitbrush, and walkingstick cactus (*Cylindropuntia spinosior;* NRCS 2009).

Doak-Sheppard-Shiprock association (rolling)

This soil association comprises approximately 19.9 acres of the proposed pipeline corridor and TUAs Nos. 3, 4, 5, and 6. It is composed of 40 percent Doak and similar soils, 30 percent Sheppard and similar soils, and 20 percent Shiprock and similar soils. This soil type has a moderate potential for water erosion and low to moderate potential for wind erosion. The potential plant community for this soil type is usually comprised of James' galleta, Indian ricegrass, needle and thread, New Mexico feathergrass, western wheatgrass, dropseed, squirreltail, blue grama, threeawn, and alkali sacaton (NRCS 2009).

Fruitland-Persayo-Sheppard complex (hilly slopes)

This soil association comprises approximately 16.8 acres of the proposed pipeline corridor and TUAs Nos. 1, 2, and 7. It is composed of 40 percent Fruitland and similar soils, 30 percent Persayo and similar soils, and 25 percent Sheppard and similar soils. This soil complex has a low to moderate potential for water erosion and moderate to high potential for wind erosion. The potential plant community for this soil complex is comprised of James' galleta, Indian ricegrass, needle and thread, New Mexico feathergrass, grama (*Bouteloua* spp.), dropseed, purple threeawn (*Aristida purpurea*), sandhill muhly (*Muhlenbergia pungens*), squirreltail, alkali sacaton, plains pricklypear (*Opuntia polycantha*), soaptree yucca (*Yucca elata*), Mormon tea, fourwing saltbush, sagebrush (*Artemisia* spp.), broom snakeweed, rabbitbrush (*Chrysothamnus* spp.), piñon pine, and juniper (NRCS 2009).

The Badland soil type consists of nonstony barren shale uplands that are dissected by deep intermittent drainages and gullies, and is located on slopes ranging from 5 to 80 percent. The badland soils do not support vegetation in significant quantities, but can be utilized by wildlife. BLM-FFO reviewed Natural Resource Conservation Service (NRCS) soil surveys and has identified the Badland soil unit as potentially fragile. Fragile soils exhibit physical characteristics and features that affect soil behavior. Characteristics consist of Erosion Factors (Kw's) that indicate the susceptibility and erodibility of a soil to

sheet and rill erosion by water. The Kw estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Features consist of slope length, gradient and runoff potential based on the rate of water infiltration when the soils are not protected by vegetation.

3.3.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed pipeline and associated TUAs would result in direct impacts to 88.6 acres of area soils—25.9 acres in Badlands, 5.5 acres in Blancot-Councelor-Tsosie Association, 3.3 acres Blancot-Notal Association, 19.9 acres in Doak-Sheppard-Shiprock Association, 16.8 acres in Fruitland-Persayo-Sheppard Complex, 1.9 acres in Privaetes-Florita Complex, 5.2 acres Rock Outcrop-Vessilla-Menefee Complex, and 10.1 acres in Vessilla-Menefee-Orlie Complex Soil. Direct impacts to soils on these areas include redistribution, loss, compaction, and mixing of soils affected by construction activities. All disturbed acres would be reclaimed in accordance with the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013a).

All vehicle and pedestrian traffic would be restricted to disturbed areas and existing roads during pipeline construction activities. Following pipeline construction and during the operational life of the pipeline, all 88.6 acres would be reclaimed. There would be greater potential for soil erosion during the short term. Susceptibility to erosion would be the highest during construction activities. During this time, strong winds and/or precipitation events would mobilize soils. The reclaimed soil would be subject to wind and water erosion until successful reclamation has been achieved. The potential for erosion would be reduced once successful reclamation has been achieved. Soils adjacent to the project area would be indirectly impacted from storm water runoff. Proper storm water controls (diversions) and reclamation procedures would minimize the impacts to the adjacent soils.

Cumulative Impacts

The proposed project area would occur across the Escavada Wash (HUC 1408010603) and Outlet Canon Largo (HUC 1408010306). These watersheds represent the spatial analysis area for cumulative soil impacts. There are a total of 382,553.3 acres in these watersheds. Past, present, and reasonably foreseeable future impacts to soils within the combined Escavada Wash and Outlet Canon Largo watersheds are mainly associated with oil and gas extraction activities, among others. Currently, the Escavada and Outlet Canon Largo watersheds have 3,003 existing oil/gas wells with a total of 7,221.1 disturbed acres or about 1.99% of the watershed area acres. Of the 7,221.1 disturbed acres, 2,252.3 acres are long term disturbance and 4,968.9 acres are reclaimed (based on BLM-FFO data, 2015).

908 new wells targeting development of the San Jose Formation and 469 new wells targeting the Nacimiento Formation could be added to the existing wells within the analysis area (Engler et. al. 2014). These wells with associated access roads and pipelines could occupy a total of about 633,613.2 acres resulting in additional disturbance within the analysis area.

Table 7. Cumulative Oil and Gas Impact Acreages within the Escavada and Outlet Canon Largo Watersheds

Impact	Wells (number)	Total Disturbance (acres)	Long Term Disturbance (acres)	Reclamation (acres)
Proposed Action	0	88.6	0	88.6
Existing Oil and Gas Development	3,003	7,221.1	2,252.3	4,968.9
Percentage of Proposed Action	0	1.2%	0	1.8%

The above cumulative effects to soil (e.g. soil compaction and soil loss) as a result of energy development are additive to soil effects from other activities within the watersheds, such as authorized and unauthorized livestock grazing, residents, other private and public roadways, and commercial developments. Although not as common within the region, other activities that may impact soils include vegetation manipulation and management activities such as prescribed and natural fires.

Residual Impacts

Residual impacts from the proposed pipeline would be the short-term erosion and sedimentation from the 288.6 acres utilized for the pipeline. These areas would be reclaimed following construction of the proposed pipeline.

3.4. Water Resources/Quality – Surface and Ground Water

3.4.1. Affected Environment

The proposed project area is within the Blanco and the Chaco watersheds of the Upper Colorado River Hydrologic Region (BLM 2003a, 3-1 – 3-4; USGS 2009). Watersheds and sub-watersheds found within the BLM-FFO region are discussed in detail in the PRMP/FEIS (2003a, 3-1 – 3-4). Water quality of perennial streams in the BLM-FFO area varies. In general, water quality of ephemeral washes are very poor due to the highly erosive and saline soils, sparse vegetative cover, and rapid runoff conditions that are characteristic of the BLM-FFO area (2003a, 3-1 - 3-4). The majority of the project area would ultimately drain into the main body of Alamito Arroyo and Escavada Wash directly or via ephemeral drainages and tributaries. These drainages then flow into Chaco Wash which ultimately flows into the San Juan River south of Farmington, NM.

Under the Clean Water Act, the US Army Corps of Engineers (USACE) has jurisdiction over "waters of the U.S." These jurisdictional waters include those that have a "significant nexus" to traditional navigable waters. The BLM-FFO and USACE Durango Regulatory Division have determined that jurisdictional waters may include USGS watercourses (i.e., "blue line" on USGS 1:24,000 topographic maps). The proposed project area crosses 14 ephemeral drainages (USGS blue-lines) including Alamito Arroyo and Escavada Wash. Six of these ephemeral washes were significant in size to conduct wetland delineations and OHWM delineations to determine potential Waters of the U.S. in accordance with 2010, Updated Datasheet for Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States and the USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0; 2008). These six ephemeral washes are under the jurisdiction of the U.S. Army Corps of Engineers and a determination is underway as to whether the washes are jurisdictional and may potentially require a Nationwide 12 (Utilities) Permit under Section 404 of the CWA. Table 8 provides a description of the six significant ephemeral USGS drainages proposed to be crossed by the proposed pipeline and associated TUAs.

Table 8. Description of the 6 Ephemeral USGS Drainages to be crossed by the Proposed Pipeline.

	Ordinary High Water Mark		
Ephemeral Drainage Location[1]	Width (feet)	Height (feet)	Water Feature Type
36.178030, -107.607380	5	2	Ephemeral
36.178913, -107.601261	40	0.8	Ephemeral
36.180988, -107.579295	25	1	Ephemeral
36.180988, -107.570743	90	1	Ephemeral

Ephemeral Drainage Location[1]	Ordinary High Water Mark		Water Feature Type
	Width (feet)	Height (feet)	
36.185411, -107.563244	35	1.5	Ephemeral
36.186559, -107.561037	15	1.5	Ephemeral
[1]Center Latitude and Longitude			

3.4.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed pipeline would temporarily disturb and expose 88.6 acres of soil. During the construction phase of the proposed project, this soil would be susceptible to erosion, resulting in down-gradient sedimentation. Following successful reclamation of all 88.6 acres, erosion and sedimentation are expected to return to pre-construction levels. However, some localized runoff patterns would be affected by topographic changes from the pipeline for the long-term. The potential for sediment transport into the drainages would be minimized through the implementation of the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013d), and BMPs detailed in Section 2.2.2. The re-establishment of vegetation and proper site hydrological diversions would also mitigate sedimentation and therefore water quality. Proposed water-management measures would reduce soil erosion caused by stormwater runoff and assist with revegetation success.

Indirect impacts to surface water could include the accidental spills of transported or stored oil, and hazardous substances stored and utilized during pipeline construction. Discharge from these spill events could reach into nearby ephemeral drainages and ultimately the water quality of receiving perennial surface water features could be affected if response measures are not implemented timely. Occurrence of these spills is reduced due to state and federal handling and spill prevention regulations, proposed design features, and industry Best Management Practices (i.e. sized sufficiently impervious secondary containments, routine inspections and maintenance, integrity testing, drip pans, and spill response plans).

The majority of direct impacts to the drainages crossed by the proposed pipeline would be localized and short-term in nature. No impacts to ground water or freshwater-bearing groundwater aquifers are expected to occur from the proposed pipeline. The BLM-FFO and USACE - Durango Regulatory Division have determined that USACE-jurisdictional waters may include USGS waterways and are presently pending verification. Therefore, impacts to surface water resources are pending verification of the USACE.

Cumulative Impacts

The spatial analysis area for cumulative surface water impacts is the combined Escavada Wash (HUC 1408010603) and Outlet Canon Largo (HUC 1408010306) watersheds. The proposed pipeline would cumulatively contribute 88.6 acres of short-term disturbance within the analysis area. No long-term disturbance acreage would be added to these watersheds as a result of the proposed pipeline. The primary past, present, and reasonably foreseeable future impacts to surface water in the analysis area are associated with oil and gas extraction activities (**SECTION 3.3.2 CUMULATIVE IMPACTS**). Proposed pipeline surface disturbance impacts relative to existing and future surface disturbances associated with oil and gas activities within the Chaco and Blanco Canyon watersheds are summarized in Table 7 of **SECTION 3.3.2**.

Cumulative effects to surface water (e.g. sedimentation, salinity, and spilled pollutants) as a result of energy development are additive to the effects from other activities within the two watersheds, such as authorized and unauthorized livestock grazing, residents, other private and public roadways, and

commercial developments. The potential for cumulative effects to surface water from spilled pollutants from drilling, completion or workover operations is relative to the number of well sites undergoing these activities within the watersheds and the distance of those sites from waterways. Although not as common within the region, other activities that may impact surface water include vegetation manipulation and management activities such as prescribed and natural fires.

Residual Impacts

A residual impact of the proposed pipeline is the continued potential for spills across the project's operational life. The changes to localized topography and therefore water flow would be long-term.

3.5. Upland Vegetation

3.5.1. Affected Environment

The proposed project is located within the San Juan Basin ecological region, containing a plateaus, valleys, and canyons subregion. The landscape within this subregion is characterized as a mixture of desert scrub and semi-desert shrub-steppe vegetation communities. Common species found in this subregion consists of shadscale, four-wing saltbush, Mormon tea, Indian ricegrass, James' galleta, blue grama, and black grama (*Bouteloua eripoda*).

The proposed project area is located within the Upper San Juan Watershed (Hydrologic Unit Code 14080101). The general region surrounding the proposed project area is characterized by a mixture of oil and gas development; fragmented riparian corridors; big sagebrush shrublands; cliffs and rock outcrops; and Chaco Culture National Park. The terrain within the proposed project area ranges from generally even to hilly. Elevation within the survey area ranges from approximately 6,675 feet to 7,340 feet.

The general region surrounding the proposed project area is characterized by valleys vegetated with sagebrush shrublands, mesas vegetated with open to dense piñon-juniper woodlands, and open ponderosa pine woodlands. Minimally vegetated badlands are also scattered throughout the region.

The proposed project area is characterized by four vegetation communities, which are described below.

Sagebrush Shrubland

Majority of the proposed survey area was compromised of big sagebrush shrubland. The sagebrush shrubland vegetative community dominates 46 percent of the proposed survey area. Within the sagebrush shrublands of the proposed survey area, vegetative cover is approximately 45 to 65 percent.

The dominant plant species of this vegetation community within the survey area is big sagebrush. Other plant species included gambel oak, oneseed juniper, piñon pine, antelope bitterbrush (*Purshia tridentata*), banana yucca (*Yucca baccata*), greasewood (*Sarcobatus vermiculatus),* little sagebrush (*Artemisia arbuscula*), Mormon tea, narrowleaf yucca (*Yucca angustissima*), pale wolfberry (*Lycium pallidum*), plains pricklypear (*Opuntia polyacantha*), rubber rabbitbrush (*Ericameria nauseosa*), shadscale, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), broom snakeweed, buckwheat (*Eriogonum microthecum*), longflower rabbitbrush (*Chrysothamnus depressus*), biscuitroot (*Cymopterus bulbosus*), Brack's fishhook cactus (*Sclerocactus cloveriae ssp. brackii*), claretcup cactus (*Echinocereus triglochidiatus*), cocklebur (*Xanthium strumarium*), hairy false golden aster (*Heterotheca villosa*), Indian paintbrush (*Castilleja* sp.), lambsquarter (*Chenopodium album*), rock goldenrod (*Petradoria pumila*), scarlet globemallow (*Sphaeralcea coccinea*), spiny phlox (*Phlox hoodii*), alkali sacaton, blue grama, bottlebrush squirreltail, cheatgrass (*Bromus tectorum*), Indian ricegrass, galleta, needle and thread grass, sand dropseed (*Sporobolus cryptandrus*), six-weeks grama (*Boutelous barbata*), western wheatgrass, halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*).

Piñon-Juniper Woodland

The piñon-juniper woodlands are scattered along various sections of the proposed project area. The piñon-juniper woodland vegetative community comprises 11 percent of the proposed project area. Within the piñon-juniper woodlands of the proposed project area, vegetative cover is approximately 25 to 35 percent.

The dominant plant species of this vegetation community within the proposed project area are oneseed juniper and piñon pine. Other plant species included gambel oak, ponderosa pine (*Pinus ponderosa*), antelope bitterbrush, banana yucca, big sagebrush, mountain mahogany (*Cercocarpus montanus*), narrowleaf yucca, plains pricklypear, rubber rabbitbrush, broom snakeweed, buckwheat, hairy false golden aster, rock goldenrod, blue grama, galleta, and Russian thistle.

Badland

The majority of the badlands vegetation community is located towards the eastern half, and one smaller portion of badlands occurs towards the far western end of the proposed project area. The badland vegetative community comprises 21 percent of the proposed project area. Within the badlands of the proposed project area, vegetative cover is approximately 5 to 15 percent.

The dominant plant species of this vegetation community within the proposed project area are four-winged saltbush and mountain mahogany. Other plant species included gambel oak, antelope bitterbrush, big sagebrush, greasewood, little sagebrush, narrowleaf yucca, rubber rabbitbrush, shadscale, yellow rabbitbrush, broom snakeweed, buchwheat, longflower rabbitbrush, cocklebur, hairy false golden aster, lambsquarters, puncturevine (*Tribulus terrestris*), spiny phlox, wild onion (*Allium ascalonicum*), purple three-awn, and sand dropseed.

Reclaimed Sagebrush Shrubland

Majority of the proposed project area has existing disturbance that is composed of reclaimed sagebrush shrubland. The reclaimed sagebrush shrubland vegetative community comprises 22 percent of the proposed project area. Within the reclaimed sagebrush shrubland, vegetative cover is approximately 30 to 50 percent.

The dominant plant species of this vegetation community within the proposed project area is big sagebrush. Other plant species included blue grama, cheatgrass, false buffalograss (*Munroa squarrosa*), Indian ricegrass, six-weeks grama, western wheatgrass, and Russian thistle.

3.5.2. Impacts from the Proposed Action

Direct and Indirect Impacts

During the construction phase of the proposed project, all vegetation within the 88.6 acres associated with the proposed project area would be cleared. The proposed action would result in the short-term removal and modification of the undisturbed vegetation within the permitted areas. Potential impacts pertain to changes in species composition and density, and an increased potential for invasive species to establish. Following reclamation, there would be long-term changes in the density and composition of wooded vegetation communities. Disturbed areas would be expected to re-vegetate in two or more years.

During reclamation, all of the disturbance acreage of the proposed project area would be reclaimed. The BLM-FFO Sagebrush-Grass, Piñon-Juniper and Badland vegetation community seed mixtures would be utilized; the species included in these mixtures are listed in the Reclamation Plan (Appendix E). Re-established vegetation would consist of native grass, forb, and shrub species included in the seed mixtures, as well as native species that are not deliberately planted. It is also possible that invasive, non-native species could become established within the proposed project area, as such species could be transported by project equipment and tend to thrive in disturbed areas. Following the reclamation process, the resulting vegetation community could differ from the native plant community surrounding the

proposed project area. Within reclaimed areas, it is not expected that the vegetation community would return to native conditions within 20 years (BLM 2003a, 4-18).

The deposition of fugitive dust generated during vegetation-clearing and dirt-moving activities could reduce photosynthesis and productivity of the surrounding vegetation (Thompson, et al. 1984; Hirano, et al. 1995), increase water loss in plants near the proposed project area (Eveling and Bataille 1984), and result in injury to leaves of surrounding vegetation.

Cumulative Impacts

The spatial analysis area for cumulative vegetation impacts is the combined Escavada Wash (HUC 1408010603) and Outlet Canon Largo (HUC 1408010306) watersheds. The proposed pipeline would contribute cumulatively 88.6 acres of short-term vegetative disturbance within the analysis area. The proposed pipeline would not contribute any acreage of long-term disturbance to the cumulative analysis area. The primary past, present and reasonably foreseeable future impacts to vegetation in the analysis area are associated with oil and gas extraction activities (see combined Escavada Wash and Outlet Canon Largo watersheds analysis in SECTION 3.3.2 CUMULATIVE IMPACTS). The proposed pipeline surface disturbance impacts relative to existing and future surface disturbances associated with oil and gas activities within the combined Escavada Wash and Outlet Canon Largo watersheds analysis area are calculated and summarized in Table 7 (SECTION 3.3.2).

Cumulative effects to vegetation (e.g. removal, and invasive species) as a result of energy development are additive to vegetation effects from other activities within the watersheds, such as authorized and unauthorized livestock grazing, residents, other private and public roadways, and commercial developments. Although not as common within the region, other activities that may impact vegetation include vegetation manipulation and management activities such as prescribed and natural fires.

Residual Impacts

Residual impacts from the proposed pipeline would be the long-term alteration in vegetation composition and structure on 88.6 acres.

3.6. Noxious Weeds and Invasive Species

3.6.1. Affected Environment

Management of invasive and non-native species is mandated under the Lacey Act, as amended, the Federal Noxious Weed Act of 1974, as amended and Executive Order 13112 Invasive Species (February 3, 1999). Native vegetation and undisturbed soils are less prone to the establishment of noxious and invasive plant species. Invasive species generally establish faster and tolerate disturbed soils better than other native on non-native desirable plants.

Field survey of the proposed pipeline area revealed there are no BLM-listed, invasive, non-native plant species of concern (NRCS 2010; BLM 2003a 3-34 – 3-35; NMDA 2010). Halogeton (*Halogeton glomeratus* [M. Bieb.]), a Class-B noxious weed species listed by the New Mexico Department of Agriculture, was identified along the south side of the proposed pipeline corridor (approximate stationing 385+34.12 to 403+30.59) near the middle of the pipeline corridor. Approximately 1,000 individuals were present. Russian thistle was found within the entire proposed project area and was most numerous in the reclaimed Sagebrush Shrubland Vegetation Community. Although this species is not listed on either the BLM or New Mexico Department of Agriculture noxious weed lists, it is known to out-compete desirable, native vegetation (Whitson, et al. 1992).

3.6.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Following clearing for construction of the proposed pipeline, 88.60 acres of disturbed ground would be available to increased noxious weed and invasive species establishment. Weed species could be

transported to the project area by being attached to trucks and other equipment that may originate from other areas of the United States (some could be weed prone). During construction and operation, noxious weed sources could be introduced to disturbed areas from vehicles, equipment, people, wind, water, or other mechanisms. Of particular concern are annual grasses, such as cheatgrass, which is already established within the project area and is difficult to control by mechanical and chemical applications. The spread of cheatgrass as a result of the proposed pipeline is likely. There would be a long-term potential for noxious, native and non-native invasive weeds to establish in the disturbed areas.

While reclaiming the areas of disturbances, Western would follow the guidelines established in the Farmington Field Office Bare Soil Reclamation Procedures (BLM 2013b), to meet the standards and guidelines set forth by the BLM-FFO for reclaiming disturbed lands. Reclamation would occur over all 88.60 acres of the proposed pipeline area.

Western would be responsible for monitoring and controlling all noxious and non-native invasive weed species within the permitted project area for the life of the project. Weed species would be managed following the recommendations of the BLM-FFO. Long-term control of noxious and non-native invasive weed species would serve to improve reclamation success, improve native species composition and vigor, and reduce the spread of noxious and non-native invasive weed species. Successful reclamation also serves as a weed control mechanism that reduces weed and invasive species growth through competition, but would not reduce the amount of viable weed and invasive species seeds within the soil.

Cumulative Impacts

The spatial analysis area for cumulative vegetation impacts is the combined Escavada Wash (HUC 1408010603) and Outlet Canon Largo (HUC 1408010306) watersheds. The proposed pipeline would contribute cumulatively 88.6 acres of short-term vegetative disturbance within the analysis area. The proposed pipeline would not contribute any acreage of long-term disturbance to the cumulative analysis area. The primary past, present and reasonably foreseeable future impacts to vegetation in the analysis area are associated with oil and gas extraction activities (see combined Escavada Wash and Outlet Canon Largo watersheds analysis in SECTION 3.3.2 CUMULATIVE IMPACTS). The proposed pipeline surface disturbance impacts relative to existing and future surface disturbances associated with oil and gas activities within the combined Escavada Wash and Outlet Canon Largo watersheds analysis area are calculated and summarized in Table 7 (SECTION 3.3.2).

Cumulative effects of noxious and invasive species as a result of energy development are additive to the effects from other activities within the two watersheds, such as authorized and unauthorized livestock grazing, residents, other private and public roadways, and commercial developments. Although not as common within the region, other activities that may introduce spread or result in an increase in the noxious and invasive weeds include vegetation manipulation and management activities such as prescribed and natural fires.

Residual Impacts

Residual impacts of the proposed pipeline would be the potential long-term introduction, establishment, and spread of noxious and invasive weed species on the 88.6 acres.

3.7. Wildlife

3.7.1. Affected Environment

General Wildlife

The vegetation communities found within the proposed project area provide habitat for a variety of vertebrate and invertebrate species. The objectives of the BLM wildlife management program are to "ensure optimum populations and a natural abundance and diversity of fish and wildlife values by restoring, maintaining, and enhancing habitat conditions for consumptive and non-consumptive uses" (BLM 2003a, 2-24).

No prairie dog colonies have been recorded by the BLM-FFO within or adjacent to the proposed project area (BLM 2012b); the closest recorded colony is approximately 11 miles east of the proposed project area. No sign of prairie dogs was observed during the biological surveys.

General wildlife for the proposed project is described in detail in the BSR (Appendix B).

Migratory Birds

Executive Order (EO) 13186, dated January 17, 2001, calls for increased efforts to more fully implement the Migratory Bird Treaty Act of 1918. In keeping with this mandate, the BLM-FFO has issued a reclamation policy to minimize unintentional take, as defined by the EO, and to better optimize migratory bird efforts related to BLM-FFO activities. In keeping with this policy, a list of priority birds of conservation concern which occur in ecological regions similar to the proposed project area was compiled through a review of existing bird conservation plans, including the following:

- USFWS Birds of Conservation Concern
- New Mexico Partners in Flight New Mexico Bird Conservation Plan
- Comprehensive Wildlife Conservation Strategy for New Mexico
- Gray Vireo Recovery Plan
- The North American Waterbird Conservation Plan
- Recovery plans and conservation plans/strategies prepared for federally listed candidate species

The selected species have a known distribution in the BLM-FFO area and may be affected by various types of perturbations. These species and an evaluation of their potential to occur within the proposed project area are discussed in the BSR (Appendix B); a list of species identified within the proposed project area during the biological field survey is also provided.

3.7.2. Impacts from the Proposed Action

Direct and Indirect Impacts

There is available, similar habitat in the region surrounding the proposed project area that wildlife could utilize. However, the clearing of vegetation and the transformation of the proposed project area to a reseed community would remove potential habitat and result in habitat fragmentation for numerous wildlife species, including priority bird species.

During the construction phase of the proposed project, all vegetation within the 88.6 acres associated with the proposed project area would be cleared. The proposed project area would be converted to a reseed community following reclamation. The impacts to the vegetation communities are described in detail in Section 3.5 (Upland Vegetation). If reclamation is successful, Sagebrush Shrubland, Open Piñon-Juniper Woodland, and Badland vegetation communities would become re-established within the proposed project area. However, as discussed in Section 3.5, the re-establishment of a mature, native plant community could require decades, and it is possible that the plant community could never fully recover from disturbance (BLM 2003a, 4-18).

Habitat loss and fragmentation likely reduce the carrying capacity for wildlife, although the exact level of reduction cannot be quantified (BLM 2003a, 4-26 – 4-27). Habitat fragmentation would result from construction within areas that are not adjacent to existing surface disturbance.

For the long term, occasional human and vehicle presence within the vicinity of the proposed project area would increase above present levels. Audial and visual disturbances associated with the proposed project area could cause indirect habitat loss by deterring wildlife from using available habitat adjacent to the proposed project area by conducting sagebrush shrubland removal of approximately 6.3 miles from approximate stationing 0+00 to 722+00, and piñon-juniper woodland removal of approximately 3.48 miles from approximate stationing 16+40 to 719+76.

General Wildlife

It is possible that burrowing animals could be killed or injured during the construction phase of the proposed project, as equipment digs into the earth and rolls over the surface of the ground.

During the construction phase of the proposed pipeline corridor, terrestrial wildlife could fall into the open pipeline trenches and be injured, stressed, or killed. The presence of open trenches could also disrupt normal wildlife movements to and from water and/or food sources. Wildlife could have to skirt the open-trench portions of the proposed pipeline corridor to access water and/or food. This disruption could stress wildlife and result in the loss of valuable energy resources. As discussed in Section 2.2.2 (Description of Proposed Project – Protection of Flora and Fauna, Including Special Status Species and Livestock), design features and BMPs would be implemented during the construction phase of the proposed pipeline corridor to assist in the prevention of injury, stress, or death of wildlife.

Migratory Birds

Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed project. If the vegetation-clearing phase of construction for the proposed project is scheduled to occur during migratory bird breeding season, a pre-construction nest survey would take place, as discussed in Section 2.2.2 (Description of Proposed Project – Protection of Flora and Fauna, Including SSS and Livestock). Therefore, it is unlikely that any nests, eggs, or young birds would be directly harmed by the proposed project. Birds nesting outside of but near the proposed project area could abandon existing nests as a result of visual and audial disturbances.

It is difficult to predict the effects of the proposed project on migratory birds. The increased activity, noise, and disturbed vegetation associated with the proposed project could result in the increased usage of the immediate area by some migratory bird species, while decreasing usage by other species. Studies have shown mixed impacts of oil and gas development on nesting migratory birds. According to a study by Ortega and Francis (2007), the presence of oil and gas compressors affected bird species differently; however, there was no difference in overall nest density on plots with and without compressors. A study by Holmes and King (2006) found that the sage sparrow had lower nest survival in an area with ongoing gas development; however, the Brewer's sparrow had higher nest survival rates in a developed gas field when compared with populations in an undeveloped control area.

Cumulative Impacts

The spatial analysis area for wildlife includes the proposed project area and an approximately two-mile radius surrounding the proposed project area. Within the spatial analysis area, there is existing and proposed disturbance, and the region has been fragmented. Existing and reasonably foreseeable future disturbance within the spatial analysis area includes the following:

- 84 new or active oil and/or gas wells and associated well pads
- 32 inactive oil and/or gas wells and associated well pads (some reclaimed)
- 4 proposed oil and/or gas well pads and associated roads and utility corridors
- Approximately 40 miles of existing roads (including approximately 15 miles of County Roads)
- Numerous existing and proposed utility ROWs
- Active wildlife and livestock grazing; the spatial analysis area is within the Kimbeto Community, (Allotment No.06013), Escavada AMP South of Largo Community (Allotment No. 06014), South Equus (Allotment No. 05111), Counselor Community (Allotment No. 06015), Eagle Rock (Allotment No. 05122), North Equus (Allotment No. 051210) and Largo Community (Allotment No. 05083) allotments.

Habitat disturbance and fragmentation in the spatial analysis area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors). The direct and indirect habitat disturbance, fragmentation, and human activities associated with these disturbances could deter wildlife from utilizing portions of the spatial analysis area. The proposed action would contribute to direct and indirect habitat disturbance and fragmentation in the spatial analysis area.

Residual Impacts

The residual impacts from the proposed pipeline would be the long-term alteration in wildlife species' occupation, and possibly wildlife diversity and abundance within the proposed project area and adjacent areas.

3.8. Special Status Species

3.8.1. Affected Environment

The BLM manages certain species which are not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. BLM SSS include BLM Sensitive Species and BLM-FFO Special Management Species (SMS).

New Mexico BLM State Directors has developed a list of BLM Sensitive Species for the State of New Mexico (BLM 2011a, BLM 2011b, BLM 2011c, and BLM 2012a). In accordance with BLM Manual 6840, the BLM-FFO has prepared a list of BLM-FFO SMS to focus species management efforts toward maintaining habitats under a multiple-use mandate (BLM 2008a, BLM 2008c). BLM-FFO SMS include some BLM Sensitive Species and other species for which the BLM-FFO has determined special management is appropriate (BLM 2008c). The authority for this policy and guidance is established by the ESA; Title II of the Sikes Act, as amended (16 USC 670a-670o, 74 Stat. 1052); FLPMA; and Department of Interior Manual 235.1.1A.

Based on known range and habitat, nine BLM-listed SSS have the potential to occur within the proposed project area. These species and their habitat requirements are discussed in detail in the BSR (Appendix B). Potential SSS habitat is similar within the proposed project area. The SSS with the potential to occur within the proposed project area are as follows:

- Aztec gilia (*Aliciella formosa*) (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat "zone" (BLM 2013a). No individuals identified during transect surveys of proposed project area.
- Brack's fishhook cactus (*Sclerocactus cloveriae ssp. brackii*) (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat "zone" (BLM 2013a). One individual was identified along the proposed well-connect pipeline corridor during transect surveys of the proposed project area.
- Bendire's thrasher (BLM Sensitive): potential foraging and nesting habitat available.
- Ferruginous hawk (BLM Sensitive and SMS): potential foraging and nesting habitat available.
- Golden eagle (BLM SMS): foraging and nesting habitat available.
- Prairie falcon (BLM SMS): potential foraging and nesting habitat available.
- Peregrine falcon (BLM SMS): potential foraging and nesting habitat available.
- Pinyon jay (BLM Sensitive): potential foraging and nesting habitat available.
- Spotted bat (BLM Sensitive): potential foraging and nesting habitat available.

3.8.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Aztec Gilia and Brack's Fishhook Cactus

The proposed project would result in the disturbance of up to 88.6 acres of Aztec gilia/Brack's fishhook cactus habitat. All of this acreage would be fully reclaimed. The reclaimed acreage could become populated by Aztec gilia and Brack's fishhook cacti in the future, although the likelihood of these species becoming reestablished in a recently disturbed area is unlikely.

Aztec Gilia
The exposed Nacimiento Formation soils in the project area provide potential habitat for the Aztec gilia. As no Aztec gilia were identified during the biological surveys, no direct impacts to individuals are anticipated as a result of the proposed project. However, it is possible that Aztec gilia individuals could have been overlooked during the biological surveys and could be destroyed by the proposed project.

Brack's Fishhook Cactus
The biological surveys of the proposed pipeline documented 67 Brack's fishhook cacti. It is possible that additional Brack's fishhook cacti could have been overlooked during the biological surveys (see Biological Survey Report for Western Refining's Proposed Lybrook West Pipeline Project, Appendix B). Transplantation of a portion of the Brack's fishhook cacti within the project area would be required. Transplantation of the cacti would follow BLM-FFO guidance that is currently under revision. An annual monitoring report of the transplanted cacti for three years would also be required.

The transplanted Brack's hardwall cactus would to be expected have mortality, although the percentage of transplant success is not known. Positively, scientific information may be gained by monitoring transplanted Brack's hardwall cactus populations. Impacts to Brack's hardwall cacti resulting from the proposed pipeline would affect individuals and habitats, but are not expected to result in population-level impacts and could be destroyed.

Bendire's Thrasher and Pinyon Jay

Impacts to Bendire's thrashers would be similar to those described for migratory birds (Section 3.7.2 [Wildlife– Impacts from the Proposed Action – Migratory Birds]).

Pinyon Jay

Within the proposed project area, pinyon jays used the shrublands and woodlands for foraging, and piñon-juniper woodlands for nesting. Pinyon jays were identified during the field surveys of the proposed project area.

If the vegetation-clearing phase of the project would occur during migratory bird breeding season, a pre-construction migratory bird nest survey would take place. If active nests are located during the survey, construction should not begin until birds have fledged or until the nest has been otherwise mitigated (as determined by the USFWS). Therefore, no eggs, nestlings, or active nests should be directly impacted by the proposed project area.

Due to the mobility of adult birds, it is unlikely that adult birds would be directly impacted by the proposed project area. Audial and visual disturbances associated with the proposed project area could temporarily deter these species from utilizing the proposed project area and immediately adjacent lands.

Ferruginous Hawk, Peregrine Falcons, and Prairie Falcons

Due to the mobility of adult raptors, raptors in the vicinity of the proposed project area, it is unlikely that these raptors would be directly harmed by activities associated with the proposed project. There are rocky cliff, outcrops, and canyons closely surrounding the proposed project area, especially near the northeast end of the proposed project area. Audial and visual disturbances associated with the proposed project

area could temporarily deter these species from utilizing the proposed project area and immediately adjacent lands. Surrounding the proposed project area, there is similar, available foraging habitat for these raptors.

The clearing of vegetation would result in the removal of foraging habitat and the creation of habitat fragmentation for raptors. In addition, audial and visual disturbances associated with the proposed project could cause indirect habitat loss. Habitat loss and fragmentation are described in detail in Section 3.7.2 (Wildlife – Impacts from the Proposed Action - Direct and Indirect Impacts).

Cumulative Impacts

The spatial analysis area for SSS includes the proposed project area and an approximately two-mile radius around the proposed project area. Within the spatial analysis area, there is existing disturbance and reasonably foreseeable future disturbance is anticipated. This disturbance is described in detail in Section 3.4.2 (Wildlife – Impacts from the Proposed Action – Cumulative Impacts). Habitat disturbance in the area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors).

Cumulative impacts to these SSS would be similar to those described for wildlife (Section 3.7.2 [Wildlife - Impacts from the Proposed Action – Cumulative Impacts]).

Golden Eagle

There is a known golden eagle nest within 0.2 mile of the proposed project area in the Lybrook Fossil Special Management Area, a rocky cliff, outcrop, and canyon area. The nest was active with a male and female during the initial field surveys in February and March 2015. On April 28, 2015, the golden eagle nest appeared to be abandoned. On May 3, 2015 abandonment of the nest was confirmed. NCI biologist Sarah Griffin observed the area directly below the golden eagle nest for evidence of golden eagle eggshell fragments and none where found.

Surrounding the proposed project area, there is similar, available foraging habitat for these raptors. Since the male and female golden eagle abandoned their nest, no mitigation is necessary. Audial and visual disturbances associated with the proposed project could temporarily deter these species from utilizing the proposed project area and immediately adjacent lands.

Spotted Bat

The sagebrush shrubland and open piñon-juniper vegetation communities within the proposed project area could potentially be used for foraging by prairie falcons. There is available roosting habitat provided within 0.2 miles of the proposed project area in the rocky cliffs, outcrops, and canyons. No sign of spotted bats was observed during the surveys.

Roosting sites would not be directly impacted by the proposed project area and adult bats are highly mobile. Therefore, no direct impacts to spotted bats would be expected as a result of the proposed project area. Audial and visual disturbances associated with the proposed project could temporarily deter this species from utilizing the proposed project area and immediately adjacent lands.

Brack's Hardwall Cactus

The spatial analysis area for cumulative impacts to the Brack's hardwall cactus includes the Nacimiento habitat area as identified by the BLM-FFO for the Brack's hardwall cactus. This area totals 557,113 acres. There are approximately 1,152 existing wells and about 10,576.19 acres of existing disturbances that occurs within the analysis area. This represents 0.19% of total disturbance from oil and gas well projects. It is unknown how many Brack's hardwall cacti were removed or transplanted as a result of these wells because a database of individual species located does not yet exist, only suitable habitat boundaries. A portion of the reasonable foreseeable future Mancos well developments assessed by Engler et. al. (2014) would also occur within this analysis area. Other past, present, and reasonably foreseeable future actions

such as other energy development projects, livestock grazing, commercial and residential development, wildfire, and vegetation management that may also occur across this area

The proposed pipeline would be cumulative to these existing disturbances as well as planned disturbances, and contribute 88.6 additional acres of total disturbance previously undisturbed suitable habitat and long-term impacts to any potential Brack's hardwall cacti. This acreage would be additive to the existing disturbance acres and would be a 2.0% increase to the existing disturbances.

Residual Impacts

Residual impacts from the Proposed Action would be the residual long term impacts to any potential Brack's hardwall cacti and the alteration of about 88.6 acres of suitable Brack's hardwall cactus habitat.

3.9. Cultural Resources

3.9.1. Affected Environment

The proposed project area is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the history of the San Juan Basin can be divided into five major periods: PaleoIndian (circa [ca.] 10000 B.C. to 5500 B.C.); Archaic (ca. 5500 B.C. to A.D. 400); Basketmaker II-III and Pueblo I-IV (aka Anasazi; A.D. 1-1540); and historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed descriptions of these various periods are provided in the BLM-FFO PRMP/FEIS (BLM 2003a, pp. 3-65 – 3-84) and will not be reiterated here. Additional information can also be found in an associated documented, the Cultural Resources Technical Report (Science Applications International Corporation 2002).

BLM Manual 8100, *The Foundations for Managing Cultural Resources* (2004) defines a cultural resource as "*a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups. (cf. "traditional cultural property"). Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit described in this Manual series. They may be but are not necessarily eligible for the National Register* (a.k.a. "historic property")."

In the broadest sense cultural resources include sites, buildings, structures, objects, and districts/landscapes (NPS 1997). Cultural resources (prehistoric or historic) vary considerably, and can include but are not limited to simple artifact scatters, domiciles of various types with a myriad of associated features, rock art and inscriptions, ceremonial/religious features, and roads and trails. Traditional Cultural Properties (TCPs) are cultural resources that are eligible for the National Register of Historic Places (NRHP) and have cultural values, sometimes sacred, that transcend for instance the values of scientific importance that are normally ascribed to cultural resources such as archaeological sites and may or may not coincide with archaeological sites (Parker and King 1998). Historically Native American communities are most likely to identify TCPs, although TCPs are not restricted to those associations. Some TCPs are well known while others may only be known to a small group or otherwise only vaguely known. Native American tribal perspectives on what is considered a TCP are not necessarily limited by a places National Register eligibility or lack thereof.

The National Register of Historic Places (NRHP; 36 CFR Part 60) is the basic benchmark by which the significance of cultural resources are evaluated by a federal agency when considering what effects its actions may have on those resources. To summarize, to be considered eligible for the NRHP a cultural resource must meet one or more of the following criteria: *a*) are associated with events that have significantly contributed to the broad patterns of our history; or *b*) are associated with the lives of persons significant in our past; or *c*) embody distinctive characteristics of the type, period, or method of construction, or represents the work of a master, or possesses high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or *d*) have

yielded, or may be likely to yield, information that is important in a pre-history or history. The resource, as applicable, must possess one or more of the following aspects of integrity; location, design, setting, materials, workmanship, feeling, and association. In the event a determination of eligibility cannot be made, the resource is treated as eligible (a historic property).

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR Part 800) requires federal agencies to consider what effect their licensing, permitting, funding or otherwise authorizing an undertaking, such as an APD or R-O-W, may have on properties eligible for the National Register. Pursuant to 36 CFR 800.16 (i), "*Effect means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.*" Effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Area of Potential Effect (APE) means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is typically defined as areas to be directly disturbed and areas in immediate close proximity. Cultural resources are identified and reported through a combination of literature review and pedestrian survey consistent with guidelines set forth in the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (BLM 2005).

Cultural resources within the entire APE for the Proposed Action were identified by a literature review and an archaeological BLM Class III level (100%) pedestrian survey by La Plata Archaeological Consultants (LAC) and Western Cultural Resources Management (WCRM), and reports were prepared and submitted to the BLM-FFO.lk

The LAC cultural resources inventory identified 12 cultural sites within the APE (LAC 2014-18; BLM 2015(III)019F).

The WCRM cultural resources inventory identified 2 cultural sites within the APE (WCRM(F)1384; BLM 2015(III)019.1F).

For the Proposed Action, identification of TCP's were limited to reviewing existing published and unpublished literature (e.g. Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006), and the site-specific Class III survey report prepared for the Proposed Action. In addition, the BLM's cultural resources program was contacted for information regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts.

Asaa Si'a (Place of the Pot) and a place of an Enemyway ceremonial appear to intersect with the proposed action. The proposed action is directly adjacent to existing ROW corridors in these areas. Repeated attempts at consultation with the Navajo Nation Historic Preservation Department regarding the proposed action went unanswered.

3.9.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Cultural resources tend to degrade over time from natural forces; however, many survive for hundreds or thousands of years. Any land-disturbing activity can disturb, damage, or uncover cultural resources. Direct impacts normally include alterations to the physical integrity of a historic property. If a historic property is significant for other than its information potential, direct impacts may also include the introduction of audible, atmospheric, or visual elements that are out of character for the property. A potential indirect impact from the proposed action, particularly in undeveloped areas is the increase in human activity or access to the area with an increased potential of unauthorized damage to historic properties.

Historic properties are being avoided with the implementation of design features such as but not limited to reduction of construction areas, temporary barriers, and site monitoring. These design features are detailed in the Cultural Resource Record of Review, attached to the ROW Grant. Asaa Si'a (Place of the

Pot) and a place of an Enemyway ceremonial appear to intersect with the proposed action. The proposed action is directly adjacent to existing ROW corridors in these areas. The proposed action is not known to physically threaten any TCP's, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals. The proposed action would have no direct or indirect impact on historic properties (no historic properties affected).

Cumulative Impacts

The Cumulative Impacts Analysis Area (CIAA) is the associated watershed(s).The United States is divided and sub-divided into successively smaller hydrologic units which are classified into six levels nested within each other, from the largest geographic area (region) to the smallest geographic area (subwatershed). The boundaries are distinguished by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream or similar surface waters (USGS 2013, NRCS 2013). Hydrologic units can be viewed as a naturally defined landscape and impacts to cultural resources in one part of that landscape could, theoretically, affect a broader understanding of the interrelationships between sites in the landscape as a whole. The smallest hydrologic unit area, typically from 10 to 40 K acres (15 to 62 mi^2; HUC 12) or combination thereof are used as the CIAA.

The CIAA for cultural resources is the proposed project area and the Betonnie Tsosie Wash, Escrito Canyon, and Headwaters Escavada Wash subwatersheds. The majority of the proposed action lies within the Headwaters Escavada Wash subwatershed with much smaller portions in the Betonnie Tsosie Wash and Escrito Canyon subwatersheds.

The Headwaters Escavada Wash subwatershed totals 36,264 acres. Based on New Mexico Cultural Resource Information System data (NMCRIS; February 2015) there are 186 recorded sites and approximately 18% of the subwatershed (6,640 ac) has been inventoried for cultural resources by 102 unique investigations since 1975.

The Escrito Canyon subwatershed totals 21,448 acres. Based on New Mexico Cultural Resource Information System data (NMCRIS; February 2015) there are 300 recorded sites and approximately 19% of the subwatershed (3,978 ac) has been inventoried for cultural resources by 238 unique investigations since 1977.

The Betonnie Tsosie Wash subwatershed totals 34,130 acres. Based on New Mexico Cultural Resource Information System data (NMCRIS; February 2015) there are 177 recorded sites and approximately 21% of the subwatershed (7,151 ac) has been inventoried for cultural resources by 82 unique investigations since 1975.

The cultural resources inventory coverage in the CIAA is likely higher as not all survey data is digitally available (e.g., Navajo lands, surveys since February 2015). There are no properties listed on the National Register of Historic Places, New Mexico State Register of Cultural Properties, Chaco Protection Sites, World Heritage Sites, or National Historic Trails within the CIAA. The Haynes Trading Post ACEC lies in the Escrito Canyon subwatershed approximately 7.5 miles northeast and out of sight of the proposed action on the north side of US 550. The western terminus of the proposed action lies >10 miles from the boundary of Chaco Culture National Historical Park and ca.14.5 miles from the NPS designated observation point of Pueblo Alto. Based on GIS view shed analysis ca. 1.3 ac of the proposed action lies within the middle ground (5-15 mile) view of Pueblo Alto. At that distance the proposed action will not be visible.

- What impacts would surface disturbance for the proposed action have on historic properties in the CIAA?

There would be no negative cumulative impact on known historic properties as they are being avoided by relocating the surface disturbing components of the proposed action away from the property. There would be no known negative cumulative impact on the landscape from the proposed action that would affect the seven aspects of integrity (location, design, setting, materials, workmanship, feeling, association) of known historic properties. A positive cumulative effect is the additional scientific

information yielded by the archaeological survey both in terms of site specific information and the amount of the landscape inventoried for cultural resources.

- What impacts would the project have on unknown (buried, not visible) historic properties in the CIAA?

Risks of impacting unknown (i.e., buried) historic properties is normally negligible as cultural resources "discoveries" during surface disturbing components of a proposed action are infrequent in the BLM-FFO. Since FY2000, 28 discoveries have occurred in association with 21,290 actions (e.g. road, well, pipeline, etc.), or 1:760. During that period 153,626 ac of land were inspected for cultural resources, with an average of 7.2 ac per action and one discovery per 5,472 ac per discovery. All authorizations (e.g., APDs, R-O-Ws) have stipulations, under penalty of law, requiring the reporting of and avoidance of further disturbing cultural discoveries during a proposed action. Where the risk of discoveries can be reasonably expected (e.g., ≤ 100' of a known historic property, or in environmental settings known or suspected to be conducive to buried sites), archaeological monitoring by a qualified and permitted archaeologist during initial disturbance (e.g., blading, trenching) is normally required. If buried historic properties are discovered, collaborative steps are taken to protect them in place or recover their important information.

3.10. Paleontological Resources

3.10.1. Affected Environment

The proposed project is located within the paleontological rich area of the San Juan Basin of northwestern New Mexico. The BLM uses the Potential Fossil Yield Classification (PFYC) system to identify areas with a high potential to produce significant fossil resources. The BLM's PFYC system is a predictive modeling tool that was developed to provide baseline guidance for assessing and mitigating paleontological resources. It is intended to be used at an intermediate point in analyses and to assist in determining the need for further mitigation assessment or actions.

Early Paleogene Nacimiento Formation outcrops designated as Class 5 in the PFYC occur in the proposed project pipeline. The Nacimiento Formation has produced important vertebrate, invertebrate, and plant fossils (Williamson 1996, Williamson and Lucas 1992, Tsentas 1981, and Matthew 1937). The proposed project area crosses PFYC Class 5a.

"Class 5 – Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation."

> *"Class 5a* – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities.
>
> "Class 5b – These are areas underlain by geologic units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.
>
> - Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
> - Areas of exposed outcrop are smaller than two contiguous acres.
> - Outcrops from cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
> - Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources."

Approximately 40,359.56 linear feet (7.64 miles) of the proposed pipeline is located within the Lybrook Fossil Specially Designated Area (BLM 2003a). This is illustrated on Map A.2. Project Area Map (Appendix A). A portion of the proposed pipeline area is located within PFYC Class 5a. All potentially effected components of the proposed pipeline had a comprehensive paleontological survey conducted by BLM permitted paleontological consultants, Dr. John Burris and Mr. Ken Heil, BLM from San Juan College, Farmington, New Mexico. The BLM-FFO Paleontological Coordinator also conducted ground surveys of components for the proposed project.

The paleontological survey for the proposed project was conducted on April 13, 2015. All outcrops of potential fossil bearing strata located near the proposed pipeline were also examined closely for vertebrate fossils, as were anthills located in the vicinity of potential fossil bearing outcrops. Dr. Burris and Mr. Heil survey report indicates discoveries of vertebrate fossils in areas surveyed for the proposed pipeline area. Surveyed areas and results are detailed in Appendix F, A Paleontological Resource Survey for the Western Refining Lybrook West Pipeline 10-Inch Crude Oil Pipeline Alignment Sections 27, 32, 33, and 34, T.23N., R.7W., Section 5, T.22N., R.8W., Sandoval County and San Juan County, New Mexico. Due to the results of the survey, paleontological monitoring of construction activities for the proposed pipeline is recommended.

A database search of the New Mexico Museum of Nature and Science yielded 44 Nacimiento Formation localities within one-mile of the project area. A database search of the New Mexico Museum of Nature and Science yielded 44 Nacimiento Formation localities within one mile of the proposed project area. The paleontological survey yielded a discovery of three new localities, including a fossil which is an *in-situ* turtle carapace, with only the top of the shell exposed on the surface. The remainder of the carapace was excavated from gray-orange mudrock. The second area of fossil discovery was crocodile scutes and unidentifiable bone fragments found weathering as float on the surface of gray mudrock. The source of the fossils could not be determined. The third area of discovery was bone fragments found weathering as float on the surface of gray mudrock. Again, the source of the fossils could not be determined.

3.10.2. Direct and Indirect Impacts

The Proposed Action would disturb approximately 5.29 acres on BLM public land and approximately 1.24 acres on State of New Mexico land in the Lybrook Fossil Specially Designated Area. Due to the existing fossil localities and the three new Nacimiento Formation localities discovered during paleontological field survey, monitoring by a paleontologist during surface disturbance of Nacimiento Formation is recommended for specific areas of the proposed pipeline. Monitoring is specifically recommended for the project area surveyed in secs. 27, 32, 33, and 34, T 23 N, R 7 W. Monitoring is not necessary in sec. 5, T 22 N, R 8 W, where no new localities were found, and no previously existing localities are known within one mile of the project area. Where the project crosses San Jose Formation in Sec. 27, T23N, R7W, monitoring is not necessary due to the lack of known fossil localities in the area.

The turtle carapace at Field Locality JHB 1501 must be collected by a qualified paleontologist prior to surface disturbance. (see *A Paleontological Resource Survey for the Western Refining Lybrook West Pipeline - 10 Inch Crude Oil Pipeline Alignment* in Appendix F for more details.)

All paleontological resource stipulations would be followed as indicated in the stipulations attached to the ROW Grant. If a paleontological site is discovered, the BLM-FFO Authorized Officer would be notified and the site would be avoided by personnel, personal vehicles, and company equipment.

The turtle discovery and the other two discoveries would add to the public knowledge of paleontological resources in northwestern New Mexico. Construction of the proposed pipeline may uncover other vertebrate fossils that would also add to the paleontological knowledge. Negatively, construction may provide access to the public for illegally collection, damage, or disturbance of paleontological resources.

3.10.3. Cumulative Impacts

The cumulative spatial analysis area for paleontological resources is the proposed pipeline area and immediately adjacent lands. Based on the paleontological survey of the proposed pipeline area and the

monitoring requirement, current and future actions are not anticipated to negatively impact paleontological resources. Paleontological resources have been positively impacted by the collection of scientific data, and if an additional discovery(s) were to occur, additional data may be gathered. This adds to the existing scientific knowledge base.

3.11. Livestock Grazing

3.11.1. Affected Environment

The BLM-FFO manages 208 grazing allotments with 390 grazing permittees. Authorized to graze on public lands within the BLM-FFO administrative area are cattle, sheep, goats, and horses. Of the 390 grazing authorizations, 323 are permitted under Section 3 of the Taylor Grazing Act. Additional authorizations under Section 15 permit grazing on 30 allotments in the Lindrith, New Mexico area. The proposed project would be located within the boundary of the seven grazing allotments listed in Table 9. The vegetation communities within the allotment include sagebrush shrublands and badlands with open piñon-juniper woodlands.

Table 9. Details of the Grazing Allotment Authorizations

BLM-FFO Allotment Number	Number of Livestock	Livestock Type	Grazing Period Begin Date	Grazing Period End Date	AUM[1]
Kimbeto Community 06013	1,893	Sheep, Cattle and Horses	03/01	02/28	6,312
Escavada AMP South of Largo Community Allotment No. 06014	304	Cattle and Horses	03/01	02/28	2,918
South Equus Allotment No. 05111	30	Cattle	03/01	02/28	328
Counselor Community Allotment No. 06015	2,435	Sheep, Cattle and Horses	03/01	02/28	5,902
Eagle Rock Allotment No. 05122	56	Cattle	03/01	02/28	250
North Equus Allotment No. 05121	13	Cattle	03/01	02/28	156
Largo Community Allotment No. 05083	717	Cattle and Sheep	100	100	3,046

[1]Animal Unit Month. Equal to one cow or one cow/calf pair for one month.
Source: BLM-FFO 2015.

Eight existing fence lines are crossed by the proposed project.

3.11.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed project would result in the surface disturbance of 79.4 acres within the allotments listed in Table 3-7 above. The acreage impacted by the proposed project within each allotment in detailed in Table 3-8.

Table 3-8. Acreage and Short-term AUM loss due to the Proposed Project by Grazing Allotment

BLM-FFO Allotment Number	Acres of Short-term Disturbance	Acres per AUM (Estimated)	AUMs Removed by the Proposed Project over the Short-Term	Percentage of the Allotment AUMs Removed over the Short-Term
Kimbeto Community 06013	18.01	25	0.72	<1
Escavada AMP South of Largo Community Allotment No. 06014	24.96	25	1.00	<1
South Equus Allotment No. 05111	8.34	25	0.33	.025
Counselor Community Allotment No. 06015	18.52	25	0.74	<1
Eagle Rock Allotment No. 05122	8.53	25	0.34	3.4
North Equus Allotment No. 05121	0.43	25	0.02	<1
Largo Community Allotment No. 05083	0.65	25	0.03	<1

[1]Animal Unit Month. Equal to one cow or one cow/calf pair for one month.
Source: BLM-FFO 2015.

Additional short-term impacts could include displacement of permitted livestock during construction activities or exposure of livestock to hazards. After construction, livestock should become acclimated to the wells and traffic associated with their maintenance. Vehicle traffic associated with the wells could pose impacts to livestock, considering that the area is open range and livestock may be found on roads in the area.

Direct impacts to livestock could occur if holes or ditches are not excluded properly. Any type of hole or ditch is potentially a hazard to livestock while grazing. Livestock injuries could occur if these animals fall into or try to get out of a ditch-type cavity. Livestock leg injuries could also occur if a small hole is left uncovered. Livestock could step into the hole and break a leg. Mitigation associated with the protection of livestock during pipeline trenching is discussed in detail in Section 2.2.2 (Description of Proposed Project – Design Features and Best Management Practices - Protection of Flora and Fauna, including SSS and Livestock).

As discussed in Section 2.2.2 (Description of Proposed Project – Protection of Flora and Fauna, Including SSS and Livestock), eight existing fence lines crossed by the proposed project area would be braced, cut, and temporarily gated on each side of the proposed pipeline corridor to accommodate ROW traffic. During reclamation, the fence lines would be re-built following *The Gold Book* (BLM and USFS 2007) standards.

Cumulative Impacts

The spatial analysis area for livestock grazing is the combined seven allotments listed in Table 3-9. The allotments contain a combined total of 311,944.56 acres. Each allotment contains existing disturbances from oil and gas development, residences and other associated developments, as well as Rio Arriba, San Juan and Sandoval county roads. Table 3-9 details the existing and potential Mancos-Gallup Formation oil development disturbance acreages within each allotment.

Table 10. Cumulative Short-term Acreage and Short-term AUM Losses due to the Number of Wells by Grazing Allotment

BLM-FFO Allotment Number	Number of Existing Wells[1]	Acres of Short-Term Disturbance Associated with Existing Wells[2]	Acres of Short-term Disturbance Associated with Potential Wells[3]	Acreage of Short-Term Disturbance Added by the Proposed Project	Percentage of the Total Short-Term Acreage Removed by the Proposed Project and Other Cumulative Actions	Percentage of the Total Short-Term AUMs [4] Removed by the Proposed Project and Other Cumulative Actions
Kimbeto Community 06013	57	163.68	537.00	18.01	<1	<1
Largo Community 5083	67	237.08	1139.28	.65	1.9	1.8
Escavada AMP South of Largo Community Allotment No. 06014	28	80.82	221.52	24.96	<1	<1
South Equus Allotment No. 05111	11	25.55	126.51	8.34	2	2
Counselor Community Allotment No. 06015	99	267.70	675.25	18.52	<1	<1
Eagle Rock Allotment No. 05122	24	68.21	167.27	8.53	4	4
North Equus Allotment No. 05112,	23	66.39	374.79	.43	1.1	1.1
Totals	309	909.43	3241.62	79.4	<1	<1

[1,2,3] Based on BLM-FFO 2015 data and Engler et.al. 2014
[4]Animal Unit Month. Equal to one cow or one cow/calf pair for one month. Based on 25 acres per AUM.
Source: BLM-FFO 2015

Much of the existing previous disturbance, especially disturbance created prior to 1988 has been taken into account in the carrying capacity of each allotment. The proposed project would add a total of 79.4 acres of short-term disturbance, or a total short-term loss of 3.2 AUMs to the existing disturbance.

Reasonably foreseeable activities that would impact livestock grazing within the seven-allotment area include additional energy developments, additional residences and associated developments, off-highway vehicle traffic, vegetation treatments, and permitted and non-permitted livestock grazing.

Residual Impacts

The proposed pipeline short-term disturbance of 79.4 acres would result in the short-term removal of 3.2 AUMs.

3.12. Travel and Transportation

3.12.1. Affected Environment

The proposed pipeline would be located within an existing oil and gas field currently experiencing concentrated development. The proposed pipeline project would utilize U.S. Highway 64 and U.S. Highway 550 for transporting personnel, equipment, and materials. County roads (CR), including CR7900 and CR7950 providing public access to Chaco Culture National Historic Park, other county roads, private roads, and oil and gas field roads would also be used as access. CR7900 and CR7950 would be crossed by horizontal drilling (CR7900 - once and 7950 - twice). The other roads would be crossed by trenching, while striving to maintain public access. Some of the area roads are unimproved dirt surface.

3.12.2. Impacts from the Proposed Action

Direct and Indirect Impacts

There would be transportation of use and disposal of some materials associated with and pipeline construction activities that are classified as hazardous and regulated by the U. S. Environmental Protection Agency (EPA) and NMDOT. Most substances and wastes generated by are exempt from hazardous materials regulations under the Resource Conservation and Recovery Act.

Flammable or combustible substances such as fuels and acids/gels (corrosives) associated with vehicles and the welding processes may be transported to the proposed pipeline project. These hazardous materials may include oil, fuel, hydraulic fluid, and coolants. These chemicals are subject to reporting under the Emergency Planning and Right-to-Know Act of 1968 and may be used, produced, stored, transported or disposed of in association with the Project.

Risks to public travel and transportation associated with the Proposed Action include increased traffic on public roads with potentially oversized and non-typical loads. Occasionally trucks from the project would be transporting some type of hazardous material. Delays in travel may be experienced. Some of the roads in the area are unimproved dirt surface and can become hazardous or impassable during periods of inclement weather. Western does not plan to upgrade or improve any roads.

Cumulative Impacts

Cumulative impacts of the proposed pipeline would be recognized in relation to the level of concentrated development that currently occurs in this area. Development activities as related to construction of the proposed pipeline would be added to existing development such as nearby highway activity, other energy infrastructure work, and oil and gas activity. The proposed pipeline would be added to future activities that are reasonably certain to occur. Because the proposed pipeline would be located within an existing oil and gas field, direct and indirect cumulative impacts to public travel and transportation would not be measurably different compared to past, present and reasonably predicted future activities.

Pipeline construction would add to the existing area traffic, increasing public travel and transportation risks over the short-term. Oversized and non-typical loads, as well as delays in travel may be experienced. This could be compounded by public "tourist" traffic going to Chaco Culture National Historical Park.

3.13. Environmental Justice

3.13.1. Affected Environment

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, requires that Federal agencies identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

Environmental justice refers to the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, programs, and policies. It focuses on environmental hazards and human health to avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Guidance on environmental justice terminology developed by the President's Council on Environmental Quality (CEQ 1997) is discussed below.

- Low-income population. A low-income population is determined based on annual statistical poverty thresholds developed by the US Census Bureau. In 2012, poverty level is based on total income of $11,720 for an individual and $23,283 for a family of four (US Census Bureau 2012a). A low-income community may include either a group of individuals living in geographic proximity to one another or dispersed individuals, such as migrant workers or Native Americans.

- Minority. Minorities are individuals who are members of the following population groups: American Indian, Alaskan Native, Asian, Pacific Islander, Black, or Hispanic.

- Minority population area. A minority population area is so defined if either the aggregate population of all minority groups combined exceeds 50 percent of the total population in the area or if the percentage of the population in the area comprising all minority groups is meaningfully greater than the minority population percentage in the broader region. Like a low-income population, a minority population may include either individuals living in geographic proximity to one another or dispersed individuals.

- Comparison population. For the purpose of identifying a minority population or a low-income population concentration, the comparison population used in this study is the state of New Mexico as a whole.

Low-income Populations

Income and poverty data estimates for study area counties from the US Census Small Area Poverty Estimates model indicate that the percent of the population living below the poverty level in the socioeconomic study area as a whole is slightly above that of the State (21.3 percent and 20.6 percent), but it is much higher than the national average of 15.9 percent (Poverty levels ranged from 37.7 percent in McKinley County to 13.7 percent in San Juan County. Only that of Sandoval County was below the state average).

Table 11. Study Area County Population in Poverty (2002-2012)

	McKinley County	Rio Arriba County	Sandoval County	San Juan County	Study Area Total	New Mexico	United States
Percent of Population in Poverty 2002	21,766	7,165	19,934	22,152	71,017	421,123	34,569,951
	30.2%	17.7%	11.1%	18.2%	21.3%	20.6%	12.1%
Percent of Population in Poverty 2012	27,296	8,806	18,502	25,802	80,406	327,444	48,760,123
	37.7%	22.0%	13.7%	20.3%	21.5%	17.7%	15.9%
Median Household Income 2002	$25,197	$30,557	$45,213	$34,329	N/A	$34,827	$45,409
Median Household Income 2012	$29,821	$36,900	$57,376	$45,901	N/ A	$42,828	$51,371
Classified as Low Income Population in 2012 based on CEQ[1] guidelines.	No	No	No	No	No	NA	NA

[1] Council on Environmental Quality
Source: US Census Bureau 2013

Similarly, estimates from 2012 indicate that Sandoval and San Juan Counties had household median incomes ($57,376 and $45,901) that were above the state level of $42,828. McKinley County ($29,821) and Rio Arriba County ($36,900) were below that of the state in 2012 (Table). While no area communities meet the CEQ definition of a low-income population area (50 percent or higher), the highest poverty rates were seen in Bloomfield (29 percent), Espanola (26.3 percent), and Bernalillo (24.1 percent).

Table 12. Study Area Key Community Race/Ethnicity and Poverty Data

Community	% Population Racial or Ethnic Minority	Classified as Minority Population based on CEQ	% of Individuals Below Poverty	Classified as Low-income Population based on CEQ
Aztec	36.4%	No	14.4%	No
Bernalillo	78.8%	Yes	24.1%	No
Bloomfield	55.8%	Yes	29.0%	No
Espanola	91.6%	Yes	26.3%	No
Farmington	48.8%	No	15.5%	No
Gallup	76.9%	Yes	20.9%	No
Rio Rancho	46.7%	No	9.8%	No

Source: US Census Bureau 2012b
Note: American Community Survey estimates are based on data collected over a 5-year time period. The estimates represent the average characteristics of populations between January 2008 and December 2012 and do not represent a single point in time.

Census Tracts are geographic regions within the United States that are defined by the US Census Bureau in order to track changes in a population over time. Census Tracts are based on population sizes and not geographic areas. The average population of a Census Tracts is about 4,000 people, so rural areas that are sparsely populated may have very large Census Tracts while densely populated urban areas may have very small Census Tracts.

When broken down by Census Tract, 3 out of 87 tracts in the socioeconomic study area have greater than 50 percent of individuals living below the poverty line: Census Track 9440 in eastern McKinley County had an individual poverty rate of 54.6 percent; Census Tract 9405 in southwestern McKinley County had an individual poverty rate of 59.4 percent; and Census Tract 9409 in northwestern Sandoval County had an individual poverty rate of 51.9 percent (US Census Bureau 2012b). These 3 Census Tracts are all relatively large, indicating a sparsely populated, rural area.

Minority Populations

Based on 2008-2012 data, minorities made up 59.5 percent of the population in New Mexico, compared to 36.3 percent in the United States as a whole (Table). The proportion of minorities in the socioeconomic study area (65.3 percent) substantially exceeded the United States and is slightly higher than the state average. At the county level, the population ranged from 89.7 percent minority in McKinley County to 52.8 percent in Sandoval County. Within relevant tribal nations, Native Americans represented the vast majority of the population. The largest minority groups were Hispanics/Latinos in Rio Arriba and Sandoval Counties and Native Americans in McKinley and San Juan Counties.

Table 13. Study Area County Population by Race/Ethnicity (2008-2012)

Population	McKinley County	Rio Arriba County	Sandoval	San Juan	Study Area	New Mexico	United States	Jicarilla Apache Nation	Navaho Nation	Ute Mountain Nation
Hispanic or Latino ethnicity of any race	9,744	28,714	46,334	24,496	109,288	952,569	50,545,275	382	2,958	99
	13.6%	71.4%	35.3%	19%	29%	46.3%	16.4%	11.6%	1.7%	6.0%
White alone	7,413	5,370	61,977	54,218	128,978	831,543	196,903,968	74	3,762	47
	10.3%	28.6%	47.2%	42.2%	34.67%	40.5%	63.7%	2.3%	2.2%	2.9%
Black or African American alone	353	149	2,704	794	4000	35,586	37,786,591	0	250	5
	0.5%	0.4%	2.1%	0.6%	1.08%	1.7%	12.2%	0%	0.1%	0.3%
American Indian or Alaskan Native alone	52,358	5,629	15,964	46,676	120,627	176,766	2,050,766	2,692	162,920	1,429
	72.8%	14.0%	12.2%	36.3%	32.43%	8.6%	0.7%	82.0%	94.3%	87.0%
Asian alone	506	173	1,685	464	2828	25,411	14,692,794	73	834	14
	0.7%	0.4%	1.3%	0.4%	0.76%	1.2%	4.8%	2.2%	0.5%	0.9%
Native Hawaiian and Other Pacific Islander alone	38	7	100	72	217	989	480,063	0	209	0
	0.1%	0%	0.1%	0.1%	0.06%	<.01%	0.2%	0%	0.1%	0%
Some Other Race	7	22	437	84	550	3,623	616,191	0	102	0
	<.01%	0.1%	0.3%	0.1%	0.15%	0.2%	0.2%	0%	0.1%	0%
Two or more Races	1,469	137	2,101	1,796	5,503	28,800	6,063,063	62	1,660	49
	2.0%	0.3%	1.6%	1.4%	1.48%	1.4%	2.0%	1.9%	1.0%	3.0%
Classified as Minority Population based on CEQ guidelines?	Yes	Yes	Yes	Yes		Yes	NA	Yes	Yes	Yes

Source: US Census Bureau 2012b

Note: American Community Survey estimates are based on data collected over a 5-year time period. The estimates represent the average characteristics of populations between January 2008 and December 2012 and do not represent a single point in time

Based on the CEQ definition of a minority population area (minority residents exceed 50 percent of all residents), Bernalillo, Bloomfield, Espanola, and Gallup all are considered minority communities.

When examined at the Census Tract level, there are 24 out of 87 tracts that have a minority population greater than 50 percent. These range from Census Tract 6.1 located just north of the city of Aztec with a minority population of 80.5 percent to Census Tract 107.17 located north of the city of Rio Rancho with a minority population of 50.2 percent (US Census Bureau 2012b). These Census Tracts are relatively small and are based around the city of Rio Rancho and the Aztec/Farmington/Bloomfield area.

Native American Populations

Data in Table account for a substantial portion of the study area population in some areas, notably McKinley and San Juan Counties, where the population is 72.8 and 36.3 percent American Indian respectively. Three tribal governments have reservations within the planning area: the Jicarilla Apache Nation, the Navajo Nation, and the Ute Mountain Nation (Table). The Southern Ute Nation has lands just north of the planning area in the state of Colorado, but none within the planning area. Almost one half of the planning area is tribal lands. Each tribe maintains a general concern for protection of and access to areas of traditional and religious importance, and the welfare of plants, animals, air, landforms, and water on reservation and public lands. Policies established in 2006 by the BLM and US Forest Service, in coordination with Federal tribes, ensure access by traditional native practitioners to area plants. The policy also ensures that management of these plants promotes ecosystem health for public lands. The BLM is encouraged to support and incorporate into their planning traditional native and native practitioner plant-gathering for traditional use (Boshell 2010).

Table 14. Tribal Nations in the Planning Area

Tribe	Acres in Planning Area	General Location
Jicarilla Apache Nation	739,600	The majority of the Jicarilla Apache Nation is located in western Rio Arriba County, but within the eastern portion of the planning area
Navajo Nation	860,900	A portion of the Navaho Nation extends into western San Juan County and into the western portion of the planning area
Ute Mountain Nation	103,500	A portion of the Ute Mountain Nation extends into the northern portion of San Juan County, just east of the Navajo Nation, and into the northern portion of the planning area
Unknown	196,300	Lands located in the southern portion of the planning area [Note to BLM: this is due to inconsistencies between US Census Bureau tribal areas dataset and BLM land status dataset.]
Source: US Census Bureau 2014		

3.13.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed project would result in no disproportionate, negative effects to minority or low-income populations. The proposed project would not negatively affect socioeconomics in the region.

There are a few scattered homes located on tribal surface within a one-mile radius of the proposed project area. However, no negative, direct effects to individuals, groups, or communities would be expected.

Indirectly, there could be positive, short- and/or long-term effects to socioeconomics associated with the proposed project. The proposed project could contribute to employment opportunities in the oil and gas industry. In addition, there could be taxes and royalties to state and county governments as a result of the proposed project.

Cumulative Impacts

The spatial analysis area for the proposed project is the BLM-FFO planning area. In the BLM-FFO planning area, the oil and gas industry is the dominant force in the economy. In New Mexico, the oil and gas industry provides nearly one billion dollars per year in taxes, royalties, and interest to the State; at

least half of this is related to oil and gas production in the San Juan Basin. This industry is a primary employer and provides higher paying jobs than many other job sectors available to the population. As of 2000, over 11,000 people in northwestern New Mexico were employed in the industry. Overall, the positive effects of oil and gas development in the spatial analysis area are expected to outweigh any changes in jobs, expenditures, or revenues resulting from any other actions expected or likely in the region (BLM 2003a, 3-100). The proposed project would contribute to this positive cumulative impact.

3.14. Public Health and Safety

3.14.1. Affected Environment

Worker safety is regulated under the Occupational Safety and Health Act of 1970, as amended (29 USC 651). Additional safety regulations found in Pipeline Safety Programs and Rulemaking Procedures (49 CFR 190) and Transportation of Natural and Other Gas by Pipeline: Minimal Federal Safety Standards (40 CFR 192) apply to natural gas pipelines.

The proposed project area is fairly remote. Cuba (population 734 [U.S. Census Bureau 2010]), is approximately 38.3 aerial miles to the southeast. U.S. Highway 550 is located approximately 550 feet to the south. There are no designated recreation areas or commercial areas within one mile of the proposed project area. However, a few scattered residences are located Fee-managed surface within the area; the location is accessible to the public by dirt road.

The nearest major hospital is in Farmington, New Mexico. This hospital is approximately 33 air miles or approximately 48 road miles (5 miles of dirt road and 45 miles of paved road) from the proposed project area.

3.14.2. Impacts from Proposed Action

Direct and Indirect Impacts

The proposed project would affect transportation. During construction, the proposed project would result in increased traffic on area roads; some vehicles would be hauling heavy equipment. Therefore, there would be an increased potential for traffic accidents. Dust associated with construction activities or travel on dirt access roads may result in poor visibility in the area. The increased use of dirt access roads during muddy conditions may worsen the roads' conditions. The upgrade of the existing access road would be an improvement to safety conditions. Following construction, traffic levels would be similar to current levels; long-term effects on transportation would be low.

During construction, pipeline activities, and maintenance activities, the operation of heavy equipment poses potential safety concerns. Existing facilities (such as oil and gas wells, pipelines, and power lines) could be damaged or ruptured, posing a risk to human safety.

During the operation of the proposed pipeline, facility failure (such as pipeline ruptures) could represent a potential danger to the public.

Hazardous and solid wastes associated with the proposed project are discussed in Section 2.2.2 (Description of Proposed Project – Design Features and Best Management Practices – Control of Waste). As a result of the proposed project, the public could be exposed to hazardous materials.

The proposed pipeline would be completed in a manner consistent with all applicable OSHA regulations and appropriate industry standards to minimize risk of accidents. Impacts to the public would be minimized by controlling access to all work and operation areas. All road crossings would have flaggers and spotters during heavy construction close to the area and during mobilization and demobilization. Orange flagging and barriers would be put in place to restrict public access to the work site. All roadway speed limits would be observed to reduce potential for traffic accidents. Additionally, hauling of materials or equipment would follow NMDOT regulations. Water would be applied to roads, if needed, to minimize

fugitive dust. No chemicals would be applied to roads accessing the proposed pipeline ROW. Following construction, existing roads would be rehabilitated, if needed.

As a result of the proposed project, short-term effects to public health and safety would be low to moderate. For the long-term, effects to public health and safety would be low.

Cumulative Impacts

The general BLM-FFO region has been developed by the oil and gas industry for over six decades, which contributes to public health and safety concerns in the area.

Transportation issues are a primary safety concern. Vehicles associated with the oil and gas industry utilize the developed highway and county road systems. In addition, the oil and gas industry constructs and utilizes dirt access roads in the area. These roads, most of which are accessible by the public, are often hazardous, particularly during and following periods of inclement weather.

Additional safety concerns in the region include wildfire; oil and gas facility leakage or rupture; moving equipment (such as pump jacks); oil and gas explosions; and the handling, storage, and disposal of wastes, chemicals, or condensate.

The proposed project would contribute minimally to the cumulative public safety impacts in the region.

consultation will be conducted between the BLM, SHPO, Tribes, and the public. The protocol also outlines when case-by-case SHPO consultation is or is not required for specific undertakings and the procedures for evaluating the effects of common types of undertakings and resolving adverse effects to historic properties. These common types of undertakings regularly include the common actions undertaken in the BLM-FFO.

4.2. List of Preparers

This EA was prepared by NCI in conformance with the standards of and under the direction of the BLM-FFO. The following individuals assisted in the preparation of this EA: John Leonhart, Principal Project Manager, NCI

- Sarah Griffin, Environmental Scientist, NCI
- Steve Sacks, NEPA Specialist, NCI
- Rob Mitchell, Compliance Inspector, NCI
- Jim Duncan, Compliance Inspector, NCI
- W. David Hall, P.E., Project Director, NCI
- Steve Nelson, President, NCI
- Jerry Crockford, Agency Consultant, NCI
- Amanda Nisula, Planning and Environmental Specialist, BLM-FFO
- Dale Wirth, Natural Resources Specialist, BLM-FFO
- Sheila Williams, District Botanist, BLM-FFO
- Jillian Aragon, Land Law Examiner, BLM-FFO
- John Hansen, Wildlife Biologist, BLM-FFO
- John Kendall, Wildlife Management Biologist, BLM-FFO
- Jim Copeland, Archaeologist, BLM-FFO
- Esther Willetto, Tribal Program Coordinator, BLM-FFO
- Jeff Tafoya, Range Specialist, BLM-FFO
- Monica Tilden, Realty Specialist, BLM-FFO
- Heather Perry, Natural Resource Specialist, BLM-FFO
- Sherry Landon, Paleontologist, BLM-FFO
- Craig Willems, Environmental Protection Specialist, BLM-FFO
- Scott Hall, Realty Specialist, BLM-FFO

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

Table and

Table contain a list of tribes, individuals, organizations, and agencies invited to attend the on-sites for the proposed project.

Table 15. Tribes, Individuals, Organizations, and Agencies Invited to the December 9, 2014 On-Site

Name	Tribe, Organization, or Agency	Attended On-Site
Kelly Robinson	Western Refining	Yes
Brad Ping	Western Refining	Yes
Sharon Kennedy	Independent Contractor	Yes
Merle Kennedy	Independent Contractor	Yes
John Leonhart	NCI	Yes
Rob Mitchell	NCI	Yes
Scott Hall	BLM-FFO	Yes
Steve Fuller	La Plata Archaeological Consultants	Yes
Carlos Medina	Terra Land Surveys	Yes
Angel Baeza	Terra Land Surveys	Yes

Table 16. Tribes, Individuals, Organizations, and Agencies Invited to the Mach 18, 2015 On-Site

Name	Tribe, Organization, or Agency	Attended On-Site
Kelly Robinson	Western Refining	Yes
Brad Ping	Western Refining	Yes
Doug Calder	Western Refining	Yes
Brad Raye	Western Refining	Yes
Brandon Foley	New Mexico State Lands Office	Yes
Sherrie Landon	BLM-FFO	Yes
Scott Hall	BLM-FFO	Yes
Jim Duncan	NCI	Yes
Sarah Griffin	NCI	Yes
John Leonhart	NCI	Yes
Rob Mitchell	NCI	Yes
Steve Nelson	NCI	Yes
Steve Fuller	La Plata Archaeological Consultants	Yes
Counselor Chapter House	Navajo Nation	No
Nageezi Chapter House	Navajo Nation	No

The BLM fulfills its responsibilities under the National Historic Preservation Act (NHPA) through a number of agreements. The National Programmatic Agreement (NPA; 2012) between the BLM, Advisory Council on Historic Preservation (ACHP), and the National Council of State Historic Preservation Officers (NCSHPO) allows the agency to fulfill its NHPA responsibilities according to the provisions of the NPA in lieu of 36 CFR 800.3 through 800.7 regulations. The NPA, which applies to all BLM activities below specified thresholds, provides among other things, regulatory relief in many instances from the requirement for case-by-case review by State Historic Preservation Officers (SHPOs) and the ACHP, in exchange for managers' maintenance of appropriate staff capability and observance of internal BLM standards as set out in the 8100 Manual series.

The New Mexico BLM has a two-party protocol with the New Mexico SHPO (2014) specifically encouraged by the NPA. This protocol details how the New Mexico BLM and SHPO will regulate their relationship and consult. Specifically, this document outlines among other things, how and when

4.3. References

Allen, D., A. Pacsi, D. Sullivan, D.Z. Araiza, M. Harrison, and K. Keen. 2014a. Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Pneumatic Controllers. *Environmental Science and Technology*, es5040156.

Allen, D., D. Sullivan, D.Z. Araiza, A. Pacsi, M. Harrison, and K. Keen. 2014b. Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Liquid Unloadings. *Environmental Science and Technology*, es504015.

Boshell, Cynthia. 2010. Public Land Policy as a Cultural Empowerment Tool: The Federal Land Policy and Management Act of 1976 (FLPMA), with special emphasis on the California Traditional Gathering Policy. Internet Web Site: http://users.humboldt.edu/boshell/PDF/boshell_FLPMA.pdf. Accessed September 8, 2011.

Brugge, David M. 1993. An Investigation of AIRFA [American Indian Religious Freedom Act] Concerns Relating to the Fruitland Coal Gas Development Area. Albuquerque, New Mexico: Office of Contract Archaeology, University of New Mexico. Ms. on file at BLM-FFO.

Bureau of Land Management (BLM). 2003a. Farmington Proposed Resource Management Plan and Final Environmental Impact Statement (PRMP/FEIS). Farmington, New Mexico: BLM-FFO.

_____. 2003b. Farmington Resource Management Plan with Record of Decision. (RMP and ROD). Farmington, New Mexico: BLM-FFO.

_____. 2004a. Notice to Lessees and Operators on Onshore Oil and Gas Leases Within the Jurisdiction of the Farmington Field Office - Management of Sound Generated by Oil and Gas Production and Transportation (NTL 04-2 FFO). Farmington, New Mexico: BLM-FFO.

_____. 2004b. BLM Manual 8100, The Foundations for Managing Cultural Resources.

_____. 2005. *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities.* BLM Manual Supplement H-8100-1. New Mexico, Oklahoma, and Texas.

_____. 2008a. BLM Manual 6840: Special Status Species Management.

_____. 2008b. BLM National Environmental Policy Act Handbook H-1790-1. Washington, D.C.: BLM National Environment Policy Act Program Office of the Assistant Director, Renewable Resources and Planning.

_____. 2008c. Memorandum: Farmington Field Office (FFO) Special Management Species Policy 2008 Update. Farmington, New Mexico: BLM-FFO.

_____. 2011a. BLM New Mexico Sensitive Birds List. Revised August 2011.

_____. 2011b. BLM New Mexico Sensitive Mammals List. Revised July 2011.

_____. 2011c. BLM New Mexico Sensitive Molluscs, Crustaceans, and Arthropods List. Revised August 2011.

_____. 2011d. Roads Design Handbook. H-9113-1

_____. 2011e. BLM Roads National Inventory and Condition Assessment Guidance and Instructions. H-9113-2.

_____. 2012a. BLM New Mexico Sensitive Plants List. January. 2012.

_____. 2012b. prairie_dog_colonies.shp (Shapefile of recorded prairie dog colonies within the general BLM-FFO region.. Provided by BLM-FFO 2012.

_____. 2013a. aztec_gilia_habitat (Shapefile of the new Aztec gilia and Brack's fishhook cactus potential habitat "zone. Provided by the BLM-FFO September 26, 2013.

_____. 2013b. BLM-FFO Bare Soil Reclamation Procedures. Available at: http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_planning/surface_use_plan_of.html. Accessed April 2013.

_____. 2014a. *Air Resources Technical Report for Oil and Gas Development.* Santa Fe: BLM.

_____. 2014b. Brack's Cactus Interim Guidance. Interim Memorandum No. NMF000-2014-010. February 24, 2014.

_____. 2015. Memorandum: Farmington Field Office (FFO) Special Management Alternative Policy 2015 Update. Farmington, New Mexico: BLM-FFO.

Bureau of Land Management (BLM) and U.S. Forest Service (USFS). 2007. The Gold Book: Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development – 4th Edition, revised in 2007.

Bureau of Land Management, Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. 1997. Programmatic Agreement Among the Bureau of Land Management, the Advisory Council On Historic Preservation, and the National Conference Of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet its Responsibilities Under the National Historic Preservation Act. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/Planning_and_Renewable_Resources/coop_agencies.Par.88790.File.dat/PA_Final_03_1997.pdf

Bureau of Land Management and Advisory Council on Historic Preservation (ACHP). National Programmatic Agreement (NPA; 2012) between the BLM,

Burris, John and Kenneth Heil. 2015. A Paleontological Resource Survey for the Western Refining Lybrook West Pipeline - 10 Inch Crude Oil Pipeline Alignment. Sections 27, 32, 33, and 34, T23N, R7W, Section 5, T22N, R8W Sandoval County and San Juan County, New Mexico. Prepared for Bureau of Land Management-Farmington Field Office (BLM/FFO). May 8, 2015.

Council on Environmental Quality (CEQ). 1997. Environmental Justice Guidance under the National Environmental Policy Act. December 10, 1997.

Environmental Protection Agency (EPA). 2004. Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reserves. Office of Ground Water and Drinking Water (4606M). EPA 816-R-04-003.

_____. 2012. *2005 National-Scale Air Toxics Assessment.* http://www.epa.gov/ttn/atw/nata2005/. Accessed February 27, 2014.

_____. 2013a. *Air Quality Index Report.* http://www.epa.gov/airdata/ad_rep_aqi.html. Accessed March 12, 2014.

_____. 2013b. *The Green Book Nonattainment Areas for Criteria Pollutants.* http://www.epa.gov/airquality/greenbook/. Accessed February 25, 2014.

_____. 2014a. *Air Trends: Design Values.* http://www.epa.gov/airtrends/values.html. Accessed February 25, 2014.

_____. 2014b. *The 2011 National Emissions Inventory.* http://www.epa.gov/ttn/chief/net/2011inventory.html. Accessed February 27, 2014.

Engler, Thomas W., Shari Kelly, Martha Cather. 2014. *Reasonable Foreseeable Development (RFD) for Northern New Mexico: Final Report.* New Mexico Institute of Mining and Technology. http://www.blm.gov/style/medialib/blm/nm/field_offices/farmington/farmington_planning/ffo_planning_docs/rmpa_mancos.Par.52727.File.dat/SJB%20Mancos%20RFD%20final%20report-10.27.pdf

Eveling, D.W., and A. Bataille. 1984. The effect of deposits of small particles on the resistance of leaves and petals to water loss. Environmental Pollution. 36:229-238.

Griffith, G.E., J.M. Omernik, M.M. McGraw, G.Z Jacobi, C.M. Canavan, T.S. Schrader, D. Mercer, R. Hill, and B.C. Moran. 2006. Ecoregions of New Mexico (color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia: U.S. Geological Survey (map scale 1:1,400,000).

Hirano, T., M. Kiyota, and I. Aiga. 1995. Physical effects of dust on the leaf physiology of Cucumber and Kidnekbean plant. Environmental Pollution 89(3):225-261.

Holmes, A.L. and A.V. King. 2006. Vital Rates of Sagebrush Obligate Songbirds in Relation to Natural Gas Development and Weather. Abstract Oral Presentation to IV North American Ornithological Congress. Veracruz, Mexico.

Howarth, R., R. Santoro, and A. Ingraffea. 2011. Methane and the greenhouse-gas footprint of natural gas from shale formations. Climate Change, 679-690.

Intergovernmental Panel on Climate Change. 2013. Climate Change 2013: The Physical Science Basis. Cambridge: Cambridge University Press.

Kelly, Klara, Rena Martin, Richard Begay, Ted Neff, and Clifford Werito. 2006. We Will Help You With What We Know: Diné Traditional Cultural Places In Dinétah. Flagstaff, Arizona: Museum of Northern Arizona Environmental Solutions, Inc. Ms. on file at BLM-FFO.

Kort, E., C. Frankenberg, K. Costigan, R. Lindenmaier, M. Dubey, and D. Wunch. 2014. Four corners: The largest US methane anomaly viewed from space. Geophysical Research Letters, 6898-6903

La Plata Archaeological Consultants (LAC). 2015. A Cultural Resources Survey of a Portion of Western Refining's Proposed Lybrook West 10" Pipeline, San Juan and Rio Arriba Counties, New Mexico. NMCRIS Activity No.: 133240. LAC Report No.: 2014-18. Report Dates: May 13, 2015 and June 4, 2015.

Matthew, W. D., 1937, Paleocene Faunas of the San Juan Basin, New Mexico; Transactions of the American Philosophical Society, Volume 30, 510p.

National Park Service (NPS).1997. Baseline Water Quality Data, Inventory and Analysis, Chaco Culture National Historical Park. Technical Report Water Resources Division, National Park Service, Fort Collins, CO.

Natural Resources Conservation Service (NRCS). 2009. Soil Survey of San Juan County, New Mexico: Eastern Part. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Natural Resources Conservation Service (NRCS). 2008. Soil Survey of Rio Arriba County Area, New Mexico: Parts of Rio Arriba and Sandoval Counties. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Natural Resources Conservation Service (NRCS). 2008. Soil Survey of Sandoval County Area, New Mexico: Parts of Los Alamos, Sandoval, and Rio Arriba Counties. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

--. 2010. Federal Noxious Weeds. http://plants.usda.gov/java/noxious?rptType=Federal. Accessed: May 2015.

Natural Gas Supply Association. 2010. NaturalGas.org – Uses of Natural Gas. Available at: http://www.naturalgas.org/overview/uses.asp.

New Mexico Bureau of Geology and Mineral Resources. 2012. Available at: http://geoinfo.nmt.edu/.

New Mexico Department of Agriculture. 2010. New Mexico Noxious Weed List. http://www.nmda.nmsu.edu/wp-content/uploads/2012/04/troublesome_weeds_nm.pdf. Accessed: May 2015.

New Mexico Environment Department (NMED). 2010. *Inventory of New Mexico Greenhouse Gas Emissions: 2000-2007.* Santa Fe: New Mexico Environment Department.

New Mexico Office of the State Engineer. 2011. GIS shapefile: ose_wells_July 2011. http://www.ose.state.nm.us/water_info_data.html.

Office of Natural Resources Revenue. 2012. Reported Royalty Revenue by Category – Fiscal Year 2011. Available at: http://www.onrr.gov/ONRRWebStats/Disbursements_Royalties.aspx?report=ReportedRoyaltyRevenuebyCategory&yeartype=FY&year=2011&datetype=AY.

Ortega, C.P. and C.D. Francis. 2007. Effects of Gas Well Compressor Noise on Breeding Birds in the Rattlesnake Canyon Habitat Management Area, San Juan County, New Mexico. Report to the Bureau of Land Management, Farmington Field Office. Final Report.

Parker, Patricia L., and Thomas F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. Revised. National Register Bulletin 38. U.S. Department of the Interior, National Park Service, National Register, History, and Education Division, Washington, D.C. Schneising, O., J. P. Burrows, R.R. Dickerson, M. Buchwitz, M. Reuter, and H. Bovensmann. 2014. Remote sensing of fugitive methane emissions from oil and gas production in North American tight geologic formations. Earth's Future, 548-558.

Science Applications International Corporation. 2002. Cultural Resources Technical Report: Background Information on Cultural Resources for the Farmington Draft RMP/EIS. Ms. on file at BLM-FFO, Farmington, New Mexico.

Thompson, J. R., P.W. Mueller, W. Fluckiger, A.J. and Rutter. 1984. The effects of dust on photosynthesis and its significance for roadside plants. Environmental Pollution 34(2):171-190.

Tsentas, C., 1981, Mammalian biostratigraphy of the Middle Paleocene (Torrejonian) strata of the San Juan Basin: Notes on Torreon Wash and the status of Pantolambda and Deltatherium faunal "zones"; in Lucas, Rigby, Kues, eds., Advances in San Juan Basin Paleontology, University of New Mexico Press, p. 264 – 292.

United States Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetland Delineation Manual. Wetland Research Program Technical Report Y-87-1 (on-line edition). Environmental Laboratory: Vicksburg, MS. http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf. Accessed: May 2015.

_____. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). ERDC/EL TR-08-28. USACE Research and Development Center: Vicksburg, MS.

_____. 2014. Arid West 2014 Regional Wetland Plant List. http://rsgisias.crrel.usace.army.mil/nwpl_static/data/docs/lists_2014/Regions/pdf/reg_AW_2014v1.pdf. Accessed: May 2015.

U.S. Census Bureau. 2010. American Fact Finder (2010 Census Data). Available at: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

_____. 2012a. Poverty threshold by size of family. Internet Web site: http://www.census.gov/hhes/www/poverty/data/threshld/index.html. Accessed on Accessed on February 20, 2014.

_____. 2012b. American Community Survey, 2012 American Community Survey 5-Year Estimates, Tables DP-02, DP-03, DP-04, DP-05; generated by Lauren Zielinski; using American FactFinder; http://factfinder2.census.gov. Accessed February 17, 2014.

_____. 2013. Small Area Estimates Branch 2002 and 2012 Poverty and Median Income Estimates - Release date December 2013. Accessed on February 20, 2014.

_____. 2014. US Census Bureau GIS data. Tiger Products. Internet Web Site: http://www.census.gov/geo/maps-data/data/tiger.html. Accessed on February 2014.

U.S. Department of Energy. 2011. Natural Gas Regulation. Available at: http://www.fossil.energy.gov/programs/gasregulation/index.html.

U.S. Energy Information Administration. 2012. Energy in Brief. Available at: http://www.eia.gov/energy_in_brief/major_energy_sources_and_users.cfm.

U.S. Fish and Wildlife Service (USFWS). 2014. IPaC – Information, Planning, and Conservation System. http://ecos.fws.gov/ipac/wizard/chooseLocation!prepare.action. Accessed April 2014.

U.S. Geological Survey (USGS). 1979. Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases (NTL-3A). Reporting of Undesirable Events.

Van Valkenburgh, R. F. 1941.Diné Bikeyah. Window Rock, Arizona: Department of the Interior, Office of Indian Affairs, Navajo Services. Ms. on file at BLM-FFO.

_____. 1974. Navajo Sacred Places. Edited by C. Kluckhohn. Garland American Indian Ethnohistory Series, Navajo Indians, 3 Vols. New York, New York: Garland Publishing.

Western Cultural Resources Management, Inc (WCRM). 2015. Cultural Resources Inventory of the Lybrook West Project Pipeline, Rio Arriba and Sandoval Counties, New Mexico. WCRM Report No. WCRM(F) 1384.

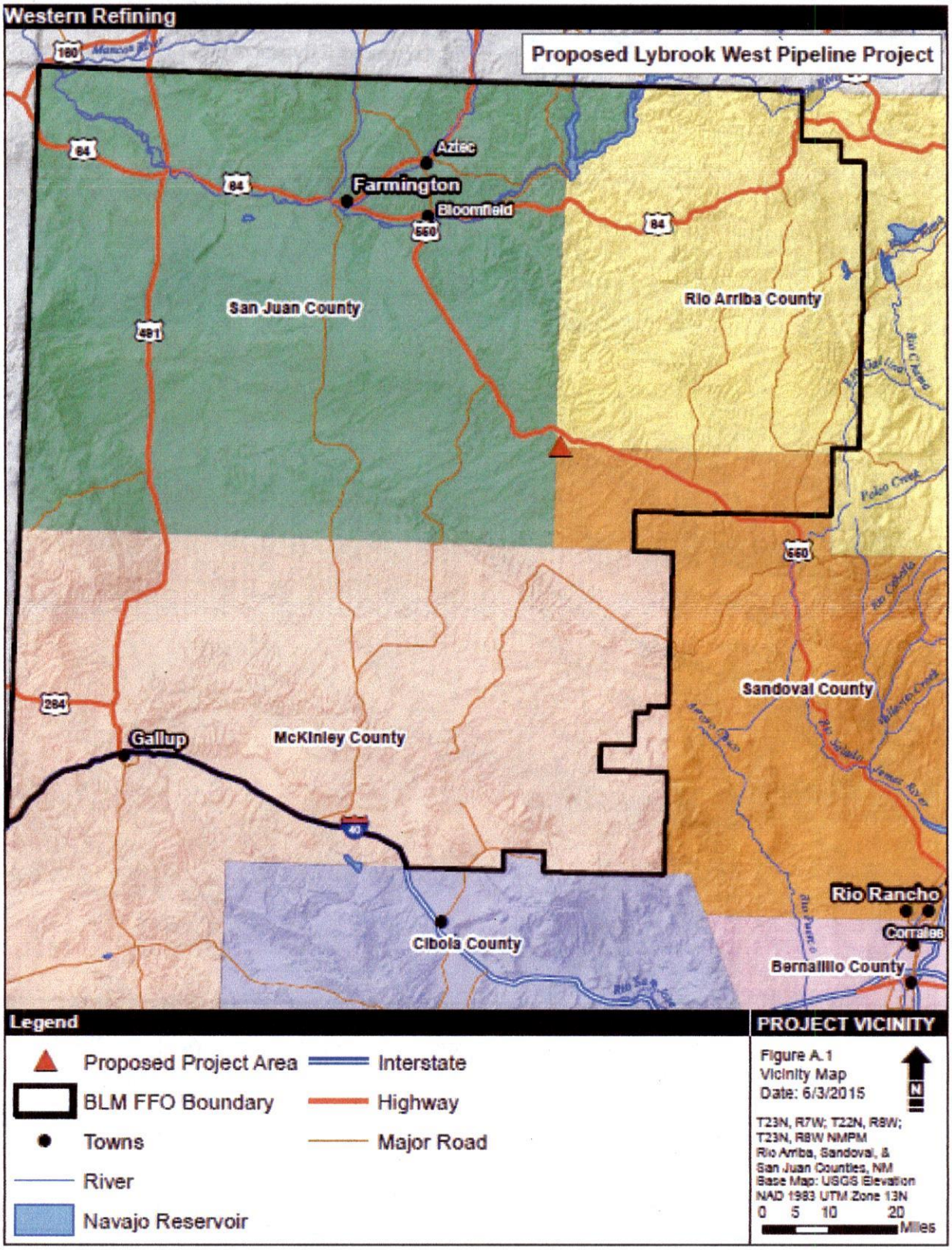
Whitson, Tom D., Larry C. Burrill, Steven A. Dewey, David W. Cudney, B.E. Nelson, Richard D. Lee, and Robert Parker. 1992. Weeds of the West, Revised. Edited by Tom D. Whitson. The Western Society of Weed Science in Cooperation with the Western United States Land Grant Universities Cooperative Extension Services.

Williamson, T. E. 1996. The Beginning of the Age of Mammals in the San Juan Basin, New Mexico: Biostratigraphy and Evolution of Paleocene Mammals of the Nacimiento Formation., New Mexico Museum of Natural History and Science, Bulletin 8, 141 pages.

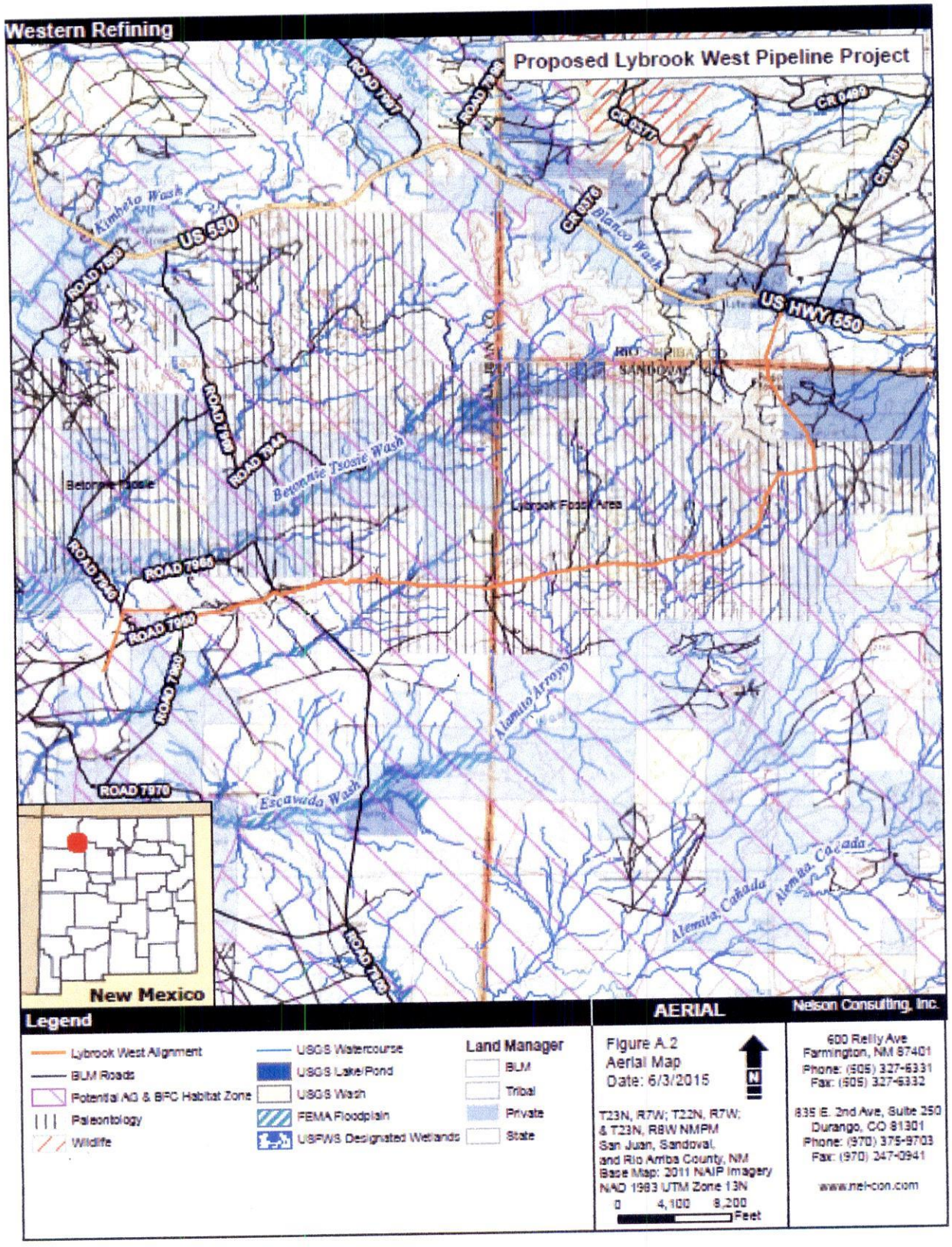
Williamson and Lucas. 1992. El Vado Ss. Mbr., Mancos Sh. (Coniacian), northwest of Mesa Prieta, Sandoval Co.

APPENDIX A. MAPS

A.1. Vicinity Map



A.2. Project Area Map



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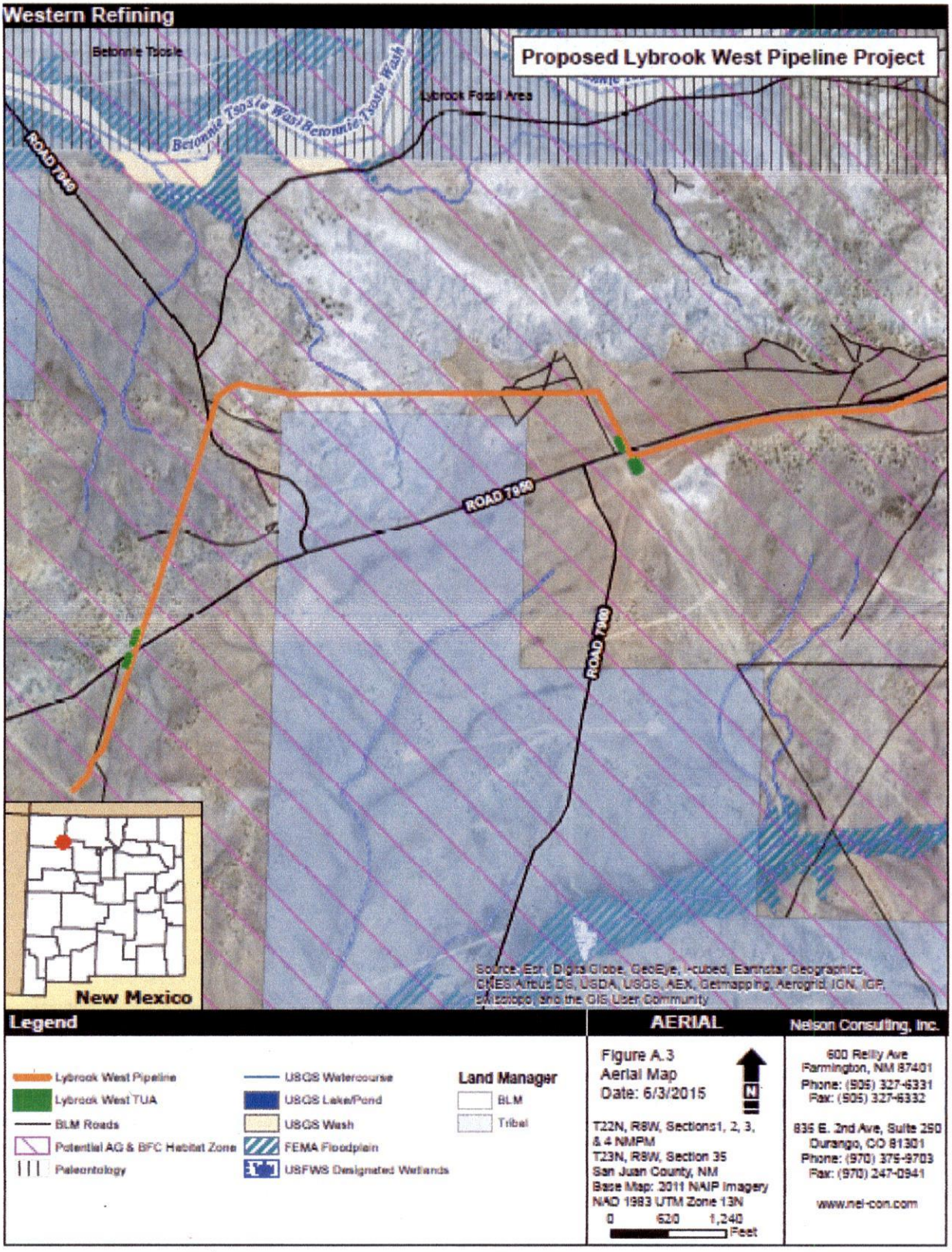

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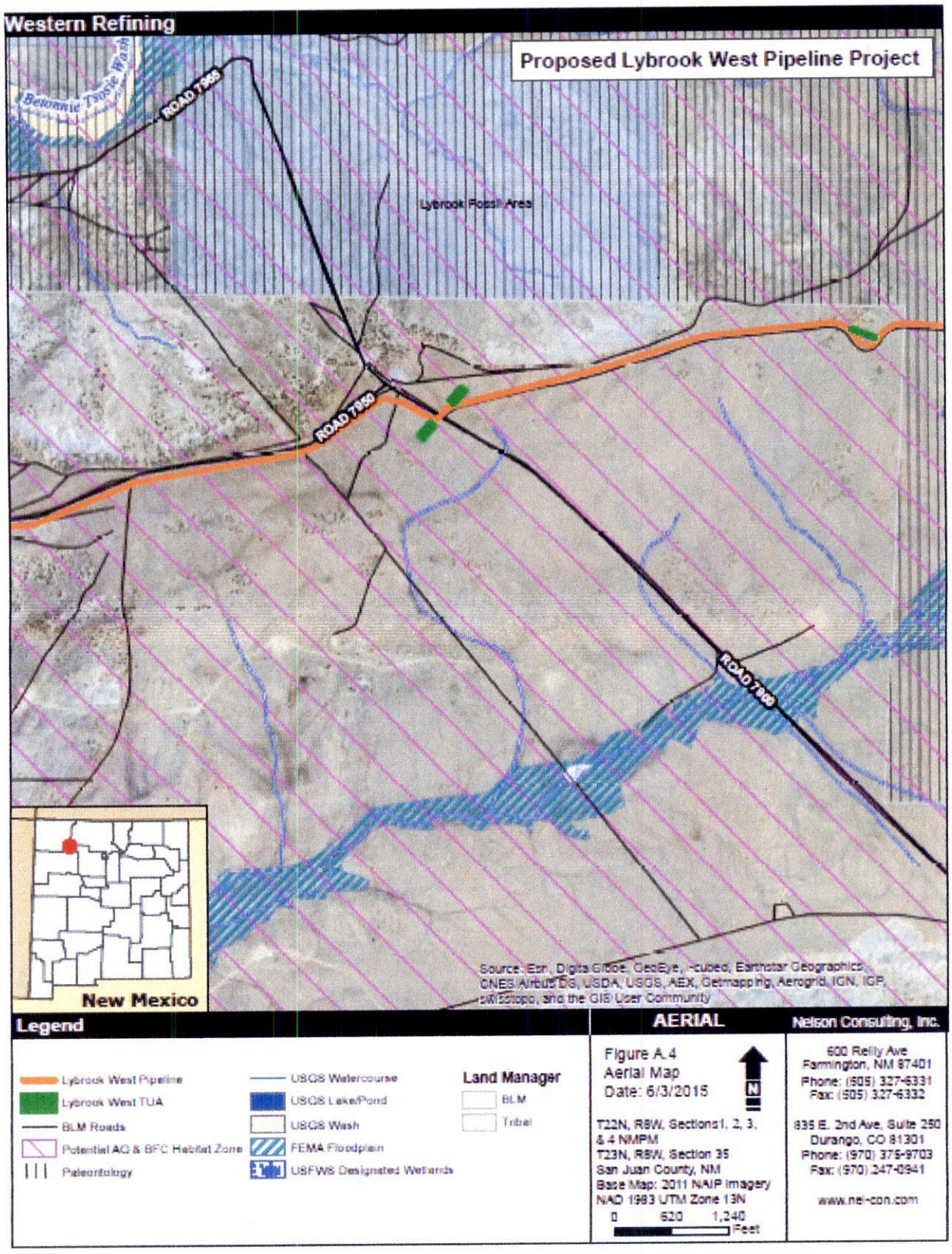

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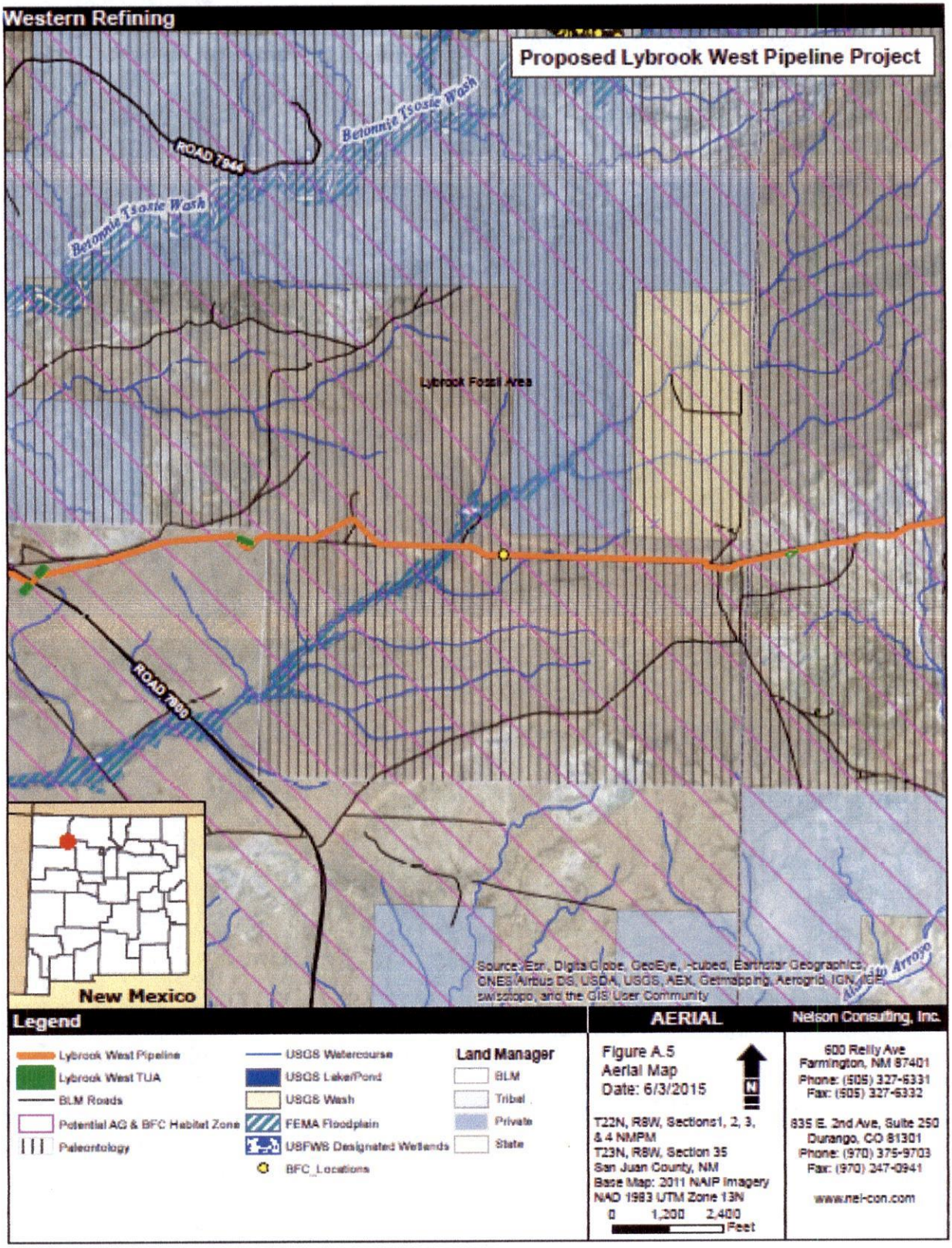

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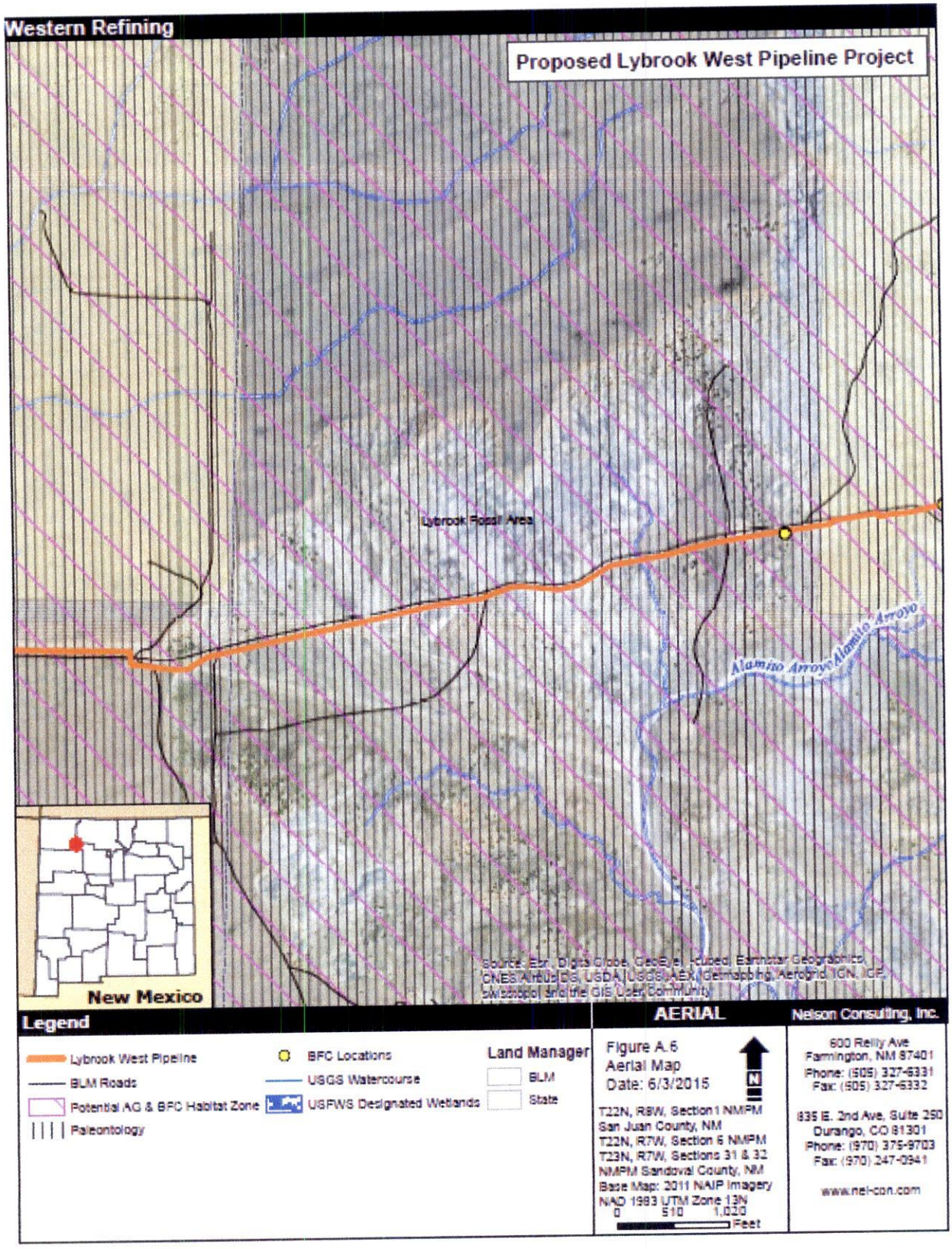

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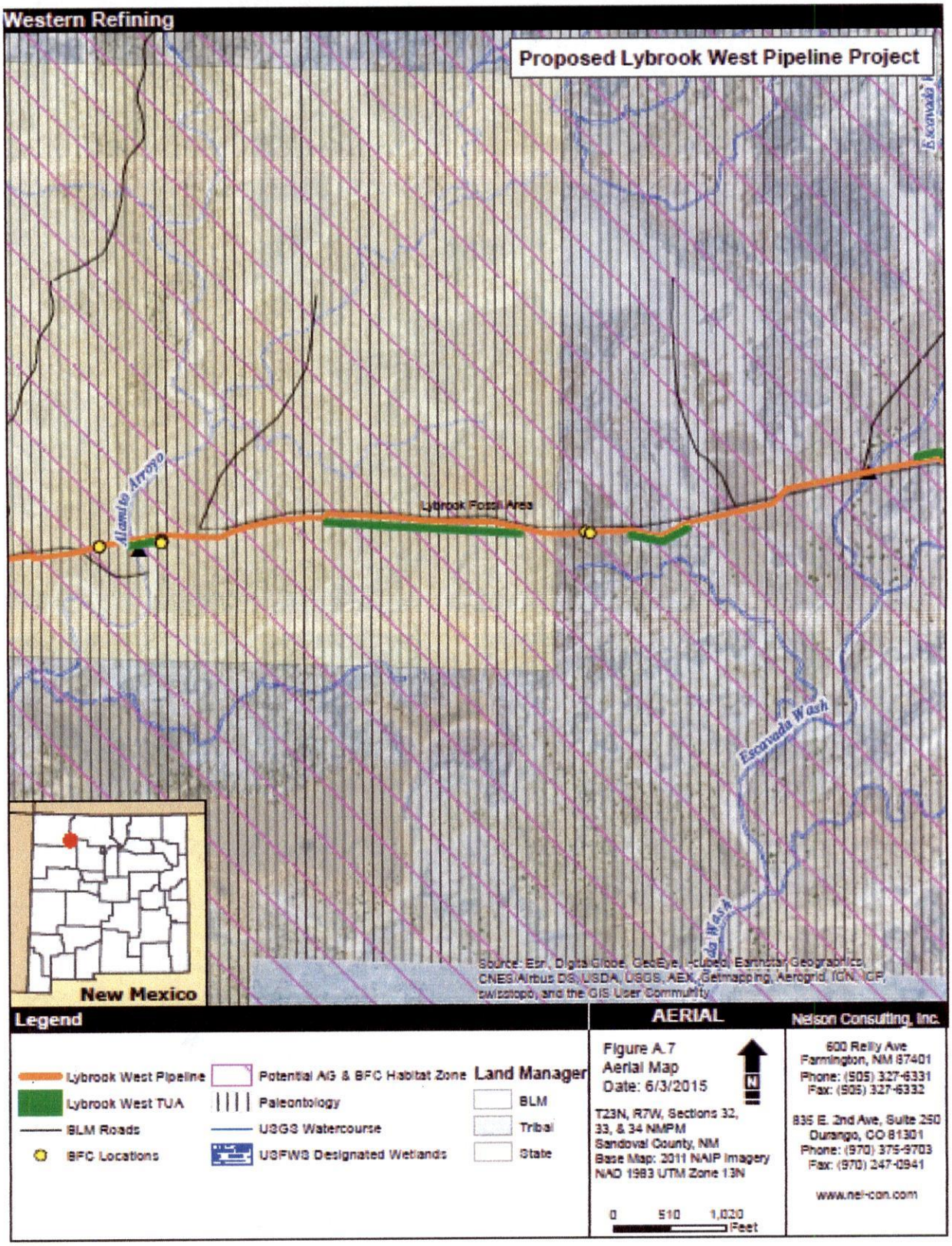

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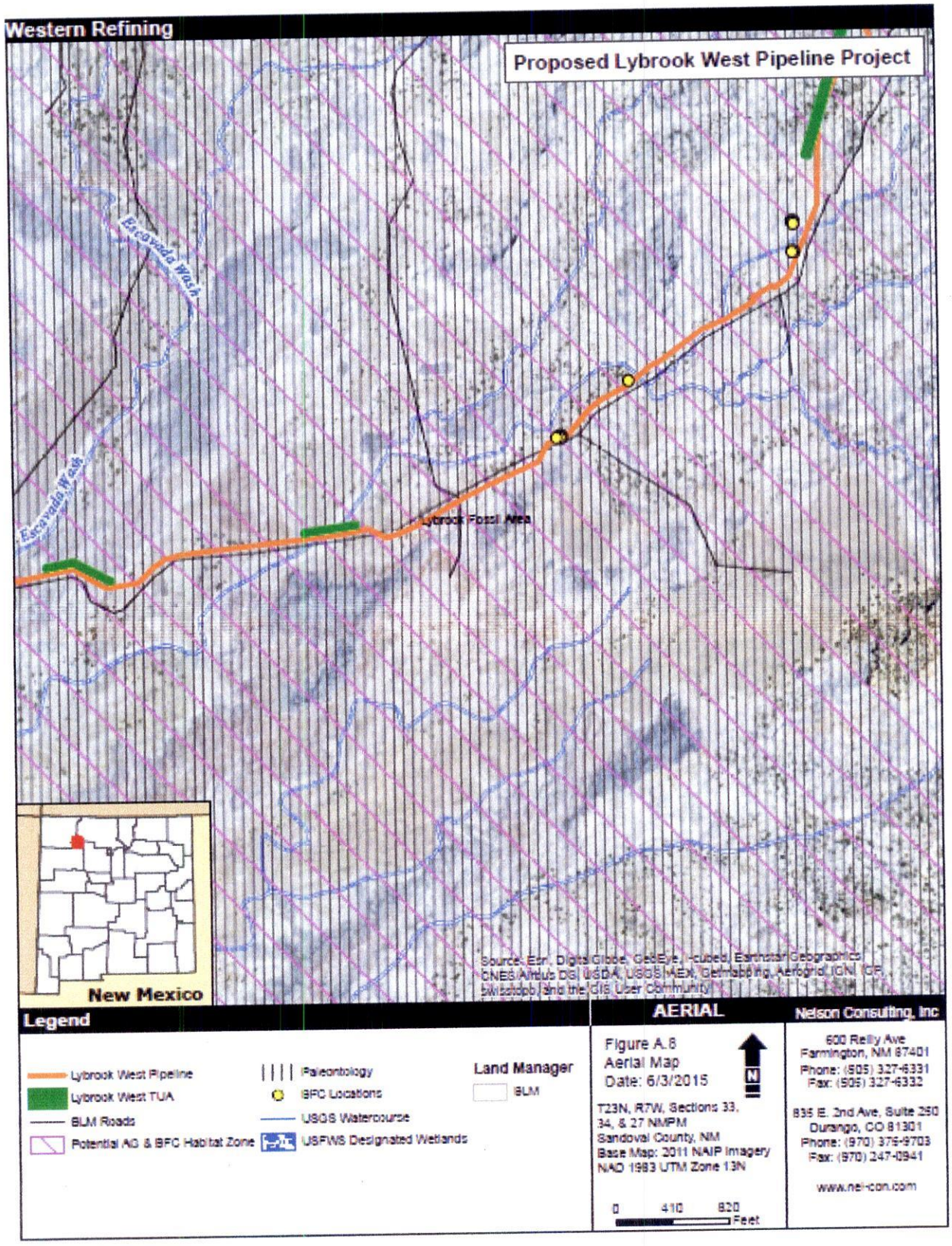

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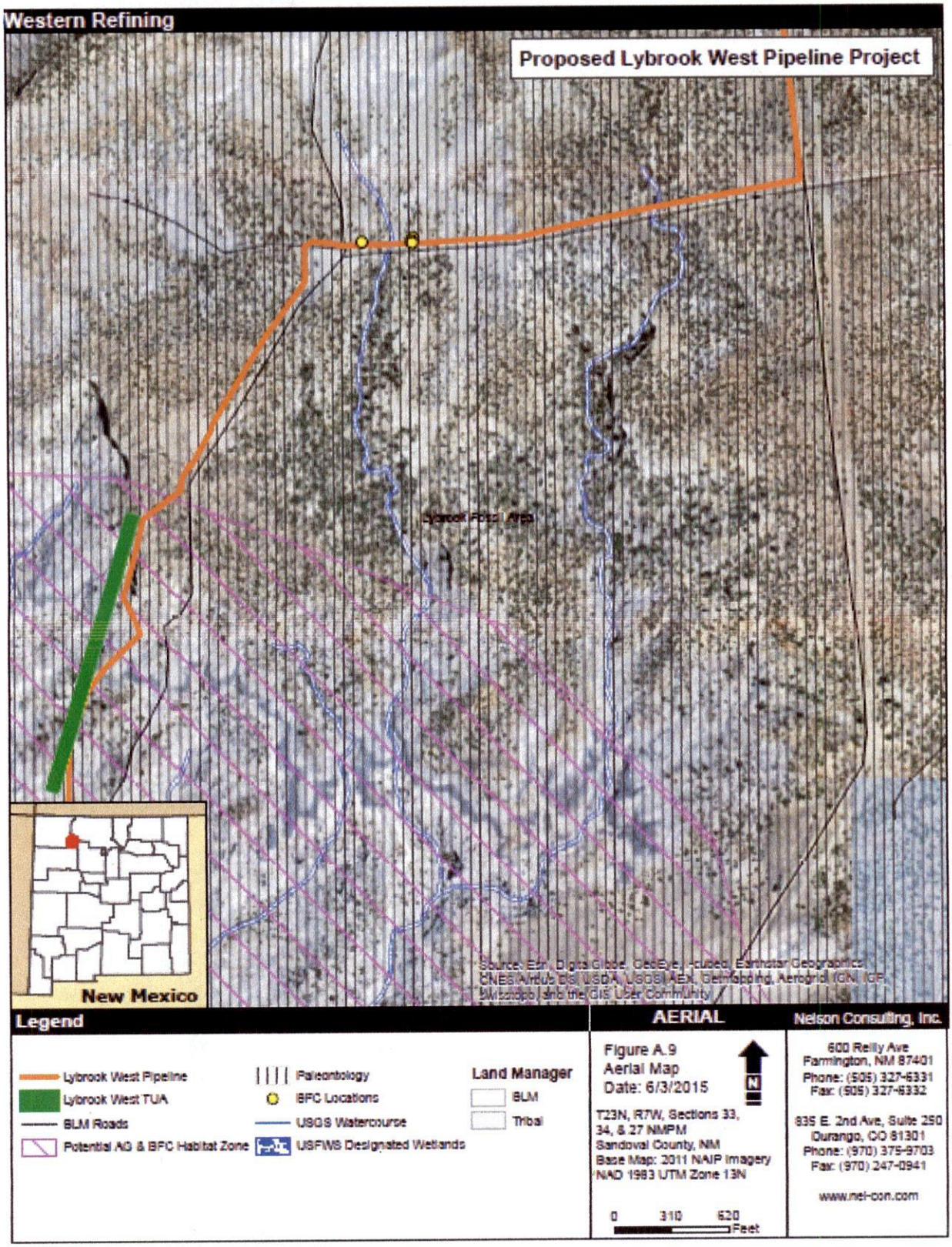
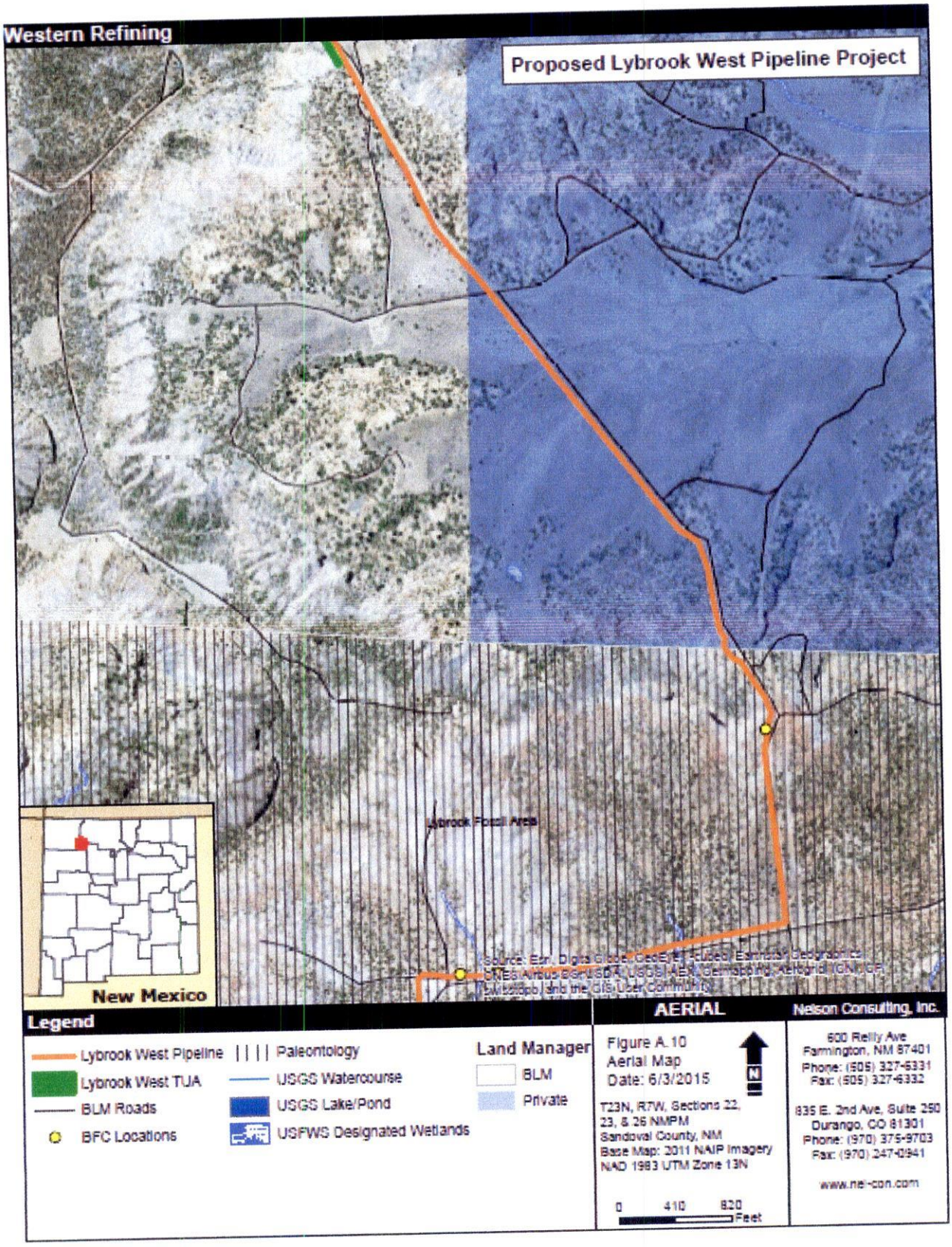
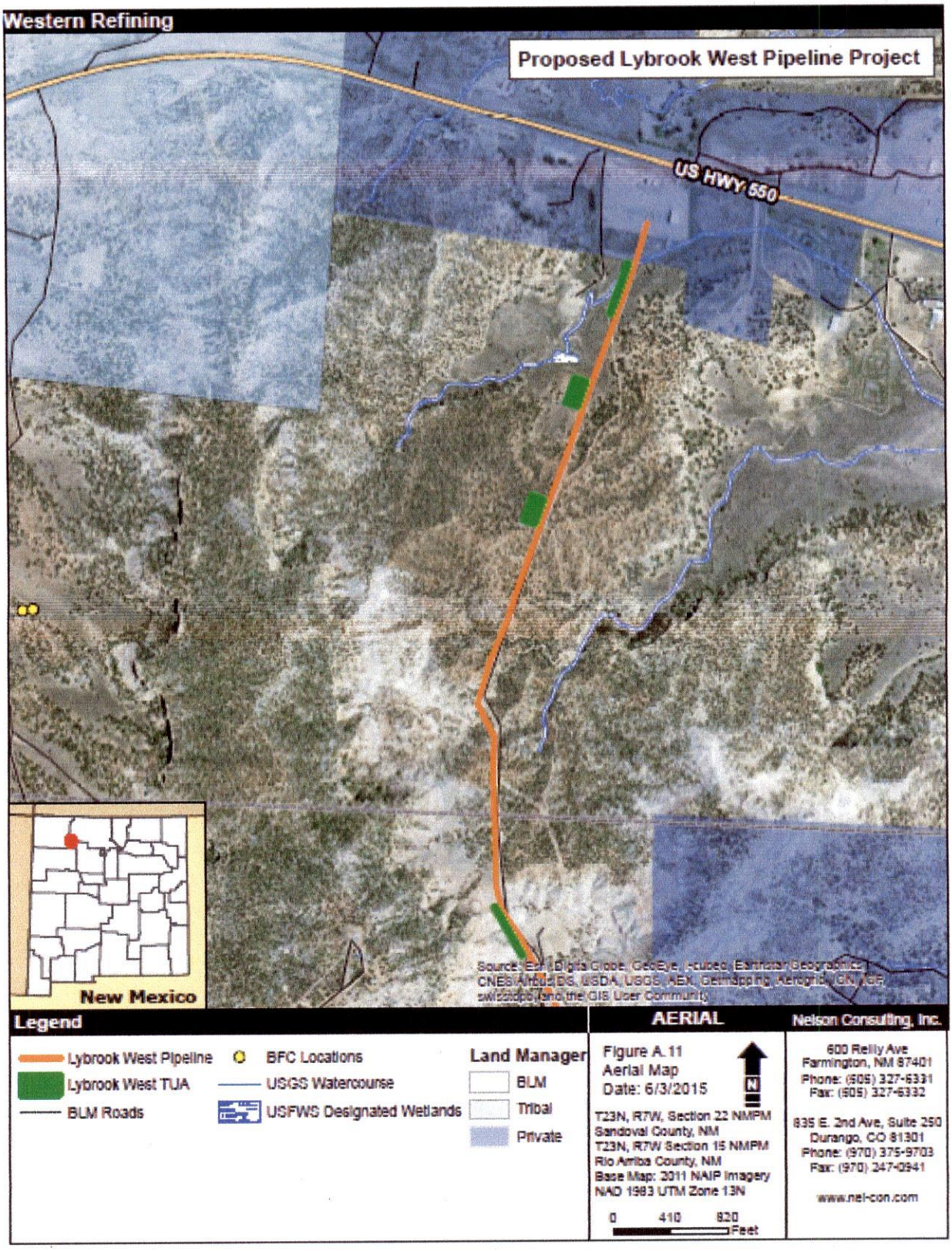


A.10. Aerial Map



A.11. Aerial Map



APPENDIX B. BIOLOGICAL SURVEY REPORT

Biological Survey Report

for

Western Refining's

Proposed
Lybrook West Pipeline Project

Prepared for:
U.S. Department of the Interior,
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1. INTRODUCTION

1.1. Purpose of Document

This Biological Survey Report (BSR) describes the potential for Special Status Species (SSS) to occur within Western Refining's (Western) proposed Lybrook West Pipeline project area. This BSR also describes the potential for these species to be impacted by the proposed project. SSS include those species listed or proposed for listing by the U.S. Fish and Wildlife Service (USFWS), State of New Mexico (State), and/or Bureau of Land Management (BLM). In addition, this BSR describes wildlife, plants (including noxious weeds), and other biological issues identified within the proposed project area.

This BSR is required because the proposed project area is within the BLM-designated habitat "zone" for two BLM SSS: Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*) and Aztec gilia (*Aliciella formosa*; BLM 2013a). The proposed project area is also within the one-third-mile nest buffer zone of a BLM and State SSS golden eagle (*Aquila chrysaetos*; BLM 2012c).

This BSR is being provided by Nelson Consulting, Inc. (NCI) to the BLM's Farmington Field Office (BLM-FFO).

1.2. Project Description

The proposed project would include the construction and final abandonment of a pipeline corridor to transport crude oil from Western's facilities located on U.S. Highway 550 to a larger existing crude oil distribution system by connecting to the existing 16-inch Western TexNew Mexico pipeline. There would also be seventeen associated Temporary Use Areas (TUAs).

Commencement of the proposed project would begin once Western receives the BLM-approved Right-of-Way (ROW) Grants. The production phase of pipeline varies; the lifetime could be up to 40 years.

Plats of the proposed project area are provided in Appendix B.

1.2.1. Permitting Agencies

The proposed project area is located on privately owned (Fee)-, State-, and BLM-FFO-managed surface.

The proposed pipeline corridor and the collective TUAs, seventeen total, would each be authorized by a BLM ROW Grant, totaling two ROW Grants.

1.2.2. Location

Maps and photographs of the proposed project area are located in Appendices A and C, respectively.

The proposed project area is located within the San Juan Basin in Rio Arriba, Sandoval, and San Juan Counties, New Mexico. The proposed project area is located approximately 38 aerial miles from the town of Cuba, New Mexico, 40 aerial miles northwest from the town of Bloomfield, New Mexico and approximately 440 feet southwest from U.S. Highway 550.

The legal locations (New Mexico Principal Meridian) of the proposed project area are located in the table below.

Table 1. Legal Land Description

Facility	Land Manager	Legal Location (New Mexico Principal Meridian)		
		Quarter-Quarter	Section	Township & Range
Pipeline Corridor	Fee	Northeast ¼ of the Northeast ¼	15	Township 23 North Range 7 West
	BLM	Southeast ¼ of the Northeast ¼		
	BLM	East ½ of the Southeast ¼		
	BLM	East ½ of the Northeast ¼	22	
	Fee	Southwest ¼ of the Northwest ¼	23	
	Fee	Northwest ¼ of the Southwest ¼		
	Fee	Southwest ¼ of the Southwest ¼		
	Fee	Southeast ¼ of the Southwest ¼		
	BLM	East ½ of the Northwest ¼	26	
	BLM	South ½ of the Northwest ¼		
	BLM	Southeast ¼ of the Northeast ¼	27	
	BLM	Northeast ¼ of the Southeast ¼		
	BLM	Southwest ¼ of the Southeast ¼		
	BLM	Western ½ of the Northeast ¼	34	
	BLM	Southeast ¼ of the Northwest ¼		
	BLM	Northwest ¼ of the Southwest ¼		
	BLM	North ½ of the Southeast ¼	33	
	BLM	Northeast ¼ of the Southwest ¼		
	BLM	Southwest ¼ of the Southwest ¼		
	State	South ½ of the Southeast ¼	32	
	State	South ½ of the Southwest ¼		
	BLM	South ½ of the Southeast ¼	31	
	BLM	Southeast ¼ of the Southwest ¼		
	BLM	North ½ of the Northwest ¼	6	Township 22 North Range 7 West
	BLM	North ½ of the Northeast ¼	1	Township 22 North Range 8 West
	BLM	North ½ of the Northwest ¼		
	BLM	North ½ of the Northeast ¼	2	
	BLM	North ½ of the Northwest ¼		
	BLM	Southeast ¼ of the Southwest ¼	35	Township 23 North Range 8 West
	BLM	North ½ of the Northeast ¼	3	Township 22 North Range 8 West
	BLM	North ½ of the Northwest ¼		
	BLM	Northeast ¼ of the Northeast ¼	4	
	BLM	Southeast ¼ of the Northeast ¼		
	BLM	Southwest ¼ of the Northeast ¼		
	BLM	South ½ of the Northwest ¼		
	BLM	Northeast ¼ of the Southeast ¼	5	
	BLM	Northwest ¼ of the Southeast ¼		
	BLM	Southwest ¼ of the Northeast ¼		
	BLM	South ½ of the Northwest ¼		
	BLM	Southeast ¼ of the Northeast ¼	6	

Facility	Land Manager	Legal Location (New Mexico Principal Meridian)		
		Quarter-Quarter	Section	Township & Range
	BLM	Northeast ¼ of the Southeast ¼		
	BLM	Southeast ¼ of the Southeast ¼		
	BLM	Southwest ¼ of the Southeast ¼		
	BLM	Northwest ¼ of the Northeast ¼	7	
	BLM	Southwest ¼ of the Northeast ¼		
TUA # 1	BLM	Southeast ¼ of the Northeast ¼	15	Township 23 North Range 7 West
TUA # 2	BLM			
TUA # 3	BLM	Northeast ¼ of the Southeast ¼		
TUA #4	BLM	Northeast ¼ of the Northeast ¼	22	
TUA # 5	BLM	Southwest ¼ of the Southeast ¼	27	
	BLM	Northwest ¼ of the Northeast ¼	34	
TUA # 6	BLM	Northwest ¼ of the Southwest ¼	34	
	BLM	Northeast ¼ of the Southeast ¼	33	
TUA # 7	BLM	Northwest ¼ of the Southeast ¼		
TUA # 8	BLM	Southwest ¼ of the Southwest ¼		
TUA # 9	State	South ½ of the Southeast ¼	32	
TUA # 10	State	Southeast ¼ of the Southwest ¼		
TUA # 11	BLM	Northeast ¼ of the Northeast ¼	3	Township 22 North Range 8 West
TUA # 12	BLM	Northwest ¼ of the Northwest ¼		
TUA # 13	BLM	Northwest ¼ of the Northwest ¼		
TUA # 14	BLM	Northwest ¼ of the Southeast ¼	5	
TUA # 15	BLM	Northwest ¼ of the Southeast ¼		
TUA # 16	BLM	Southwest ¼ of the Southeast ¼	6	
TUA # 17	BLM	Northwest ¼ of the Northeast ¼	7	

U.S. Highway 550 and existing and proposed oil and gas lease roads, well pads, and pipeline tie corridors are in the general vicinity of the proposed project area. Chaco Culture National Historical Park is located approximately 12 aerial miles southwest of the proposed pipeline project. Almost all portions of the proposed pipeline corridor overlap existing disturbance.

1.2.3. Proposed Surface Disturbance

The proposed project area would encompass 88.6 acres. Of this, 24.3 acres have been previously disturbed; the remaining 64.3 acres would be newly disturbed.

Project facilities are described further below:

- Pipeline Corridor: The proposed pipeline corridor would be 73,722 feet in length total, including BLM-FFO-, State-, and Fee-managed surface.
    - The proposed pipeline corridor would be 50 feet in width on BLM- and Fee-managed surface and 30 feet in width on State-managed surface (82.1 total acres, excluding TUAs): 74.1 acres on BLM-managed surface, 3.7 acres on State-managed surface, and 4.3 acres on Fee-managed surface.

- Approximately 61,802 feet (approximately 49.7 acres) of the proposed pipeline corridor would travel parallel and adjacent to existing surface. Where the proposed pipeline corridor parallels existing disturbance, approximately 15 feet of the proposed pipeline corridor would overlap existing disturbance

- The remainder of the proposed pipeline corridor, 2,789 feet (3.2acres) from approximate stationing 198+90 to 171+01 would not parallel existing disturbance and will be considered new surface disturbance (using the 50-foot wide ROW corridor).

- Therefore, new surface disturbance associate with the proposed pipeline corridor would be 57.8 acres total (52.9 acres on BLM-managed surface, 1.9 acres on State-managed surface, and 3.0 acres on Fee-managed surface). All of this disturbance would be fully reclaimed during reclamation.

- TUAs: Seventeen proposed TUAs (6.5 acre, total; 5.3 acres would be on BLM-managed surface and 1.2 acres would be on State-managed surface) would be associated with the proposed pipeline corridor (described below). The proposed TUAs would be fully reclaimed during reclamation.

    - TUA No. 1: A 25-by-400-foot (0.2-acre) TUA would be located on BLM-Managed surface from station 3+15 to 7+15 of the proposed pipeline corridor.

    - TUA No. 2: A 100-by-200-foot (0.5-acre) TUA would be located on BLM-Managed surface from station 12+15 to 14+15 of the proposed pipeline corridor.

    - TUA No. 3: A 100-by-200-foot (0.5-acre) TUA would be located on BLM-Managed surface from station 21+15 to 23+15 of the proposed pipeline corridor.

    - TUA No. 4: A 25-by-410-foot (0.2-acre) TUA would be located on BLM-Managed surface from station 51+16 to 55+26 of the proposed pipeline corridor.

    - TUA No. 5: A 50-by-1,539-foot (1.8 acre) TUA would be located on BLM-Managed surface from station 173+61 to 189+00 of the proposed pipeline corridor.

    - TUA No. 6: A 25-by-400-foot (0.2-acre) TUA would be located on BLM-managed surface from station 237+00 to 241+00 of the proposed pipeline corridor.

    - TUA No. 7: A 25-by-536-foot (0.3 acre) TUA would be located on BLM-managed surface from station 256+03 to 261+39 of the proposed pipeline corridor.

    - TUA No. 8: A 25-by-569-foot (0.3-acre) TUA would be located on BLM-managed surface from station 282+84 to 288+53 of the proposed corridor.

    - TUA No. 9: A 25-by-1758-foot (1.0 acre) TUA would be located on State-managed surface from station 298+13 to 315+71 of the proposed pipeline corridor.

    - TUA No. 10: A 25-by-293-foot (0.2-acre) TUA would be located on State-managed surface from station 331+21 to 334+14 of the proposed pipeline corridor.

    - TUA No. 11: A 25-by-300-foot (0.2 acre) TUA would be located on BLM-Managed surface from station 517+13 to 520+13 of the proposed pipeline corridor.

    - TUA No. 12: A 75-by-200-foot (0.3-acre) TUA would be located on BLM-managed surface from station 564+14 to 566+14 of the proposed pipeline corridor.

    - TUA No. 13: A 75-by-200-foot (0.3 acre) TUA would be located on BLM-managed surface from station 567+64 to off ROW of the proposed pipeline corridor.

- TUA No. 14: A 75-by-125-foot (0.2-acre) TUA would be located on BLM-managed surface from station 642+73 to off ROW of the proposed pipeline corridor.
- TUA No. 15: A 25-by-125-foot (0.1 acre) TUA would be located on BLM-Managed surface from station 644+00 to 645+25 of the proposed pipeline corridor.
- TUA No. 16: A 25-by-144-foot (0.1-acre) TUA would be located on BLM-managed surface from station 718+31 to 719+76 of the proposed pipeline corridor.
- TUA No. 17: A 25-by-125-foot (0.1 acre) TUA would be located on BLM-managed surface from station 721+00 to 722+25 of the proposed pipeline corridor.

2. METHODOLOGY

2.1. Off-Site Methods

Prior to conducting fieldwork, NCI obtained physical and biological information about the proposed project area from a variety of sources, which are cited in Chapters 3 (Description of Proposed Project Area) and 4 (Results) and listed in Chapter 7 (References) of this BSR.

2.2. Field Survey Methods

Biological surveys of the proposed project area were conducted by NCI biologists John Leonhart, Sarah Griffin, Eric Creeden, and Evan Crawford on February 11, 12, 14, 26, 2015; March 12, 14, 17, 18, and 27, 2015; and April 08, 2015. During the survey, habitat within and surrounding the proposed project area was evaluated for the potential for SSS to occur. Ten-foot-wide transect surveys were conducted to search for Aztec gilia and Brack's fishhook cacti. The surroundings were visually inspected with binoculars for nests, raptors, or past signs of raptor use. Digital photographs were taken of the proposed project area, and plant and wildlife species observed in the proposed project area were recorded.

3. DESCRIPTION OF PROPOSED PROJECT AREA

3.1. Physical Description

3.1.1. Geology

Local surface geology within the proposed project area is the Nacimiento Formation and the San Jose Formation. The Nacimiento Formation consists of a sequence of varicolored beds of sandstone and mudstone. The San Jose Formation is composed of a sequence of interbedded sandstones and mudstones. Thickness of the San Jose Formation ranges from less than 200 to nearly 2700 feet (U.S. Geological Survey 2005, New Mexico Bureau of Mines and Mineral Resources 1983).

3.1.2. Topography

The general region surrounding the proposed project area is characterized by flat to steep terrain, badland formations, canyons, valleys, mesas and drainages. The proposed project area is located on flat to rolling terrain with no discernable slope. The elevation of the proposed project area ranges from approximately 6,675 to 7,340 feet above mean sea level (AMSL).

Several erosional and ephemeral washes are located within and adjacent to the proposed project area. Six of these washes were significant enough in size to conduct an Ordinary High Water Mark delineation. Of these six washes, two are named Escavada Wash and Alamito Arroyo.

3.1.3. Soils

Soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. This material has been mixed and sorted in transport and has a wide range of mineralogy and particle size. The parent material of sedimentary rock consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

The Natural Resources Conservation Service (NRCS) has mapped the soils in the proposed project area. Complete soil information is available in the NRCS's *Soil Survey of San Juan County, New Mexico: Eastern Part* (NRCS 2009), *Soil Survey of Rio Arriba County, New Mexico: Parts of Rio Arriba and Sandoval Counties* (NRCS 2008), and *Soil Survey of Sandoval County, New Mexico: Parts of Los Alamos, Sandoval, and Rio Arriba Counties* (NRCS 2008).

Within the proposed project area, ten soil map units are present throughout Rio Arriba, Sandoval, and San Juan Counties. These soils are described in the sections below.

Rio Arriba County

Privaetes-Florita complex (2- to 10-percent slopes)

This soil association comprises approximately 0.3 miles of the proposed pipeline corridor. It is composed of Pinavetes and similar soils, 40 percent is composed of Florita and similar soils, and 10 percent is made up of minor soil components. This soil association is considered a well-drained to excessively drained soil with a low potential for water erosion and very high potential for wind erosion. The potential plant community for this soil complex is usually comprised of western wheatgrass (*Pascopyrum smithii*), galleta (*Pleuraphis* spp.), muttongrass (*Poa fendleriana*), bluestem (*Andropogon* spp.), Indian ricegrass (*Achnatherum hymenoides*), sand sagebrush (*Artemisia filifolia*), piñon pine (*Pinus edulis*), and oneseed juniper (*Juniperus monosperma*) (NRCS 2008).

Vessilla-Menefee-Orlie complex (1- to 30- percent slopes)

This soil association comprises approximately 0.6 mile of the proposed pipeline corridor. It is composed of approximately 45 percent Vessilla and similar soils, 25 percent is composed of Menefee and similar soils, 20 percent is composed of Orlie and similar soils, and 10 percent is made up of minor soil components. This soil association is considered a well-drained soil with a low potential for water erosion and a low to high potential for wind erosion. The potential plant community for this soil complex is usually comprised of western wheatgrass, James' galleta (*Pleuraphis jamesii*), Indian ricegrass, needleandthread (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), big sagebrush (*Artemisia tridentata*), fourwing saltbush (*Atriplex canescens*), piñon pine, oneseed juniper, and Gambel oak (*Quercus gambellii*) (NRCS 2008).

Sandoval County

Badland

This soil association comprises approximately 3.8 miles of the proposed pipeline corridor. It is composed of approximately 35 percent Badland, 30 percent Rock outcrop, and 20 percent Persayo and similar soils. This soil complex has a low to moderate potential for water erosion and low potential for wind erosion (NRCS 2009).

The depth to restrictive layer for the Rock outcrop map unit is zero inches to lithic bedrock. Available water capacity for this map unit is very low (zero inches). Rock outcrops associated with this soil complex are found along slopes ranging from 40 to 70 percent. A typical profile for the Rock outcrop map unit is bedrock from 0 to 60 inches (NRCS 2009). The potential plant community for this soil type is usually comprised of James' galleta, alkali sacaton (*Sporobolus airoides*), blue grama, black grama (*Bouteloua*

eriopoda),sideoats grama (*Bouteloua curtipendula*), piñon pine, and juniper (*Juniperus* spp.) NRCS 2009).

Blancot-Councelor-Tsosie association (0- to 5-percent slopes)

This soil association comprises approximately 0.9 mile of the proposed pipeline corridor. It is composed of approximately 40 percent Blancot soils, 30 percent Councelor soils, and 25 percent Tsosie soils. This soil association is considered a well-drained soil with a moderate potential for water erosion and a very high potential for wind erosion. The potential plant community for this soil complex is usually comprised of James' galleta, Indian ricegrass, needleandthread, New Mexico feathergrass (*Hesperostipa neomexicana*), inland saltgrass (*Distichlis spicata*),western wheatgrass, squirreltail (*Elymus elymoides*), blue grama, dropseed (*Sporobolus* spp.), alkali sacaton, winterfat (*Krascheninnikovia lanata*), big sagebrush, Mormon tea (*Ephedra viridis*), greasewood (*Sacrobatus* spp.), shadscale saltbush (*Atriplex confertifolia*), and fourwing saltbush (NRCS 2008).

Rock outcrop-Vessilla-Menefee complex (15- to 45-percent slopes)

This soil association comprises approximately 0.7 mile of the proposed pipeline corridor. It is composed of of Vessilla and similar soils, 20 percent is composed of Menefee and similar soils, and 10 percent is made up of minor soil components. This soil association has a high to very high runoff classification and a moderate to high potential for wind erosion. The potential plant community for this soil complex is usually comprised of blue grama, sideoats grama, big sagebrush, piñon pine, oneseed juniper, and Gambel oak (NRCS 2008).

Vessilla-Menefee-Orlie association (0- to 33- percent slopes)

This soil association comprises approximately 1.1 miles of the proposed pipeline corridor. It is composed of approximately 35 percent Vessilla and similar soils, 30 percent Menefee and similar soils, and 25 percent Orlie and similar soils. This soil is considered a well-drained soil with a high potential for water erosion and a very high potential for wind erosion. The potential plant community for this soil complex is usually comprised piñon pine, skunkbush sumac (*Rhus trilobata*), blue grama, and piñon pine, oneseed juniper, and Gambel oak (NRCS 2008).

San Juan County

Badland

This soil association is composed of approximately 35 percent Badland, 30 percent Rock outcrop, and 20 percent Persayo and similar soils. This soil complex has a low to moderate potential for water erosion and low potential for wind erosion (NRCS 2009).

The depth to restrictive layer for the Rock outcrop map unit is zero inches to lithic bedrock. Available water capacity for this map unit is very low (zero inches). Rock outcrops associated with this soil complex are found along slopes ranging from 40 to 70 percent. A typical profile for the Rock outcrop map unit is bedrock from 0 to 60 inches (NRCS 2009). The potential plant community for this soil type is usually comprised of James' galleta, alkali sacaton, blue grama, black grama, sideoats grama, piñon pine, and juniper (NRCS 2009).

Blancot-Notal association (gently sloping)

This soil association comprises approximately 0.6 miles of the proposed pipeline corridor. the entirety of the proposed project area. It is composed of 55 percent Blancot and similar soils and 25 percent Notal and similar soils. This soil association is considered a well-drained soil with a moderate to high potential for water erosion and low to moderate potential for wind erosion. The Blancot-Notal association (gently sloping) is typically found along fan remnant and stream terrace landforms (0- to 5-percent slopes) and within loamy and salt flat ecological sites. The potential plant community for this soil complex is usually comprised of James' galleta, Indian ricegrass, western wheatgrass, needleandthread, blue grama, New Mexico feathergrass, squirreltail, inland saltgrass, dropseed, threeawn (*Aristida* spp.), alkali sacaton,

black greasewood, fourwing saltbush, shadscale saltbush, broom snakeweed (*Gutierrezia sarothrae*), winterfat, sagebrush, rabbitbrush, and walkingstick cactus (*Cylindropuntia spinosior)* (NRCS 2009).

Doak-Sheppard-Shiprock association (rolling)

This soil association comprises approximately 2.8 miles of the proposed pipeline corridor. It is composed of 40 percent Doak and similar soils, 30 percent Sheppard and similar soils, and 20 percent Shiprock and similar soils. This soil type has a moderate potential for water erosion and low to moderate potential for wind erosion. The potential plant community for this soil type is usually comprised of James' galleta, Indian ricegrass, needleandthread, New Mexico feathergrass, western wheatgrass, dropseed, squirreltail, blue grama, threeawn, and alkali sacaton (NRCS 2009).

Fruitland-Persayo-Sheppard complex (hilly slopes)

This soil association comprises approximately 2.6 miles of the proposed pipeline corridor. It is composed of 40 percent Fruitland and similar soils, 30 percent Persayo and similar soils, and 25 percent Sheppard and similar soils. This soil complex has a low to moderate potential for water erosion and moderate to high potential for wind erosion. The potential plant community for this soil complex is comprised of James' galleta, Indian ricegrass, needleandthread, New Mexico feathergrass, grama (*Bouteloua* spp.), dropseed, purple threeawn (*Aristida purpurea*), sandhill muhly (*Muhlenbergia pungens*), squirreltail, alkali sacaton, plains pricklypear (*Opuntia polycantha*), soaptree yucca (*Yucca elata*), Mormon tea, fourwing saltbush, sagebrush (*Artemisia* spp.), broom snakeweed, rabbitbrush (*Chrysothamnus* spp.), piñon pine, and juniper (NRCS 2009).

3.2. Biological Description

3.2.1. Conditions

Weather conditions during the survey were cold to warm (approximately 40° to 60° Fahrenheit), calm to windy, and cloudy to sunny.

3.2.2. Vegetation Communities

The general region surrounding the proposed project area is characterized by valleys vegetated with sagebrush shrublands, mesas vegetated with open to dense piñon-juniper woodlands, and open ponderosa pine woodlands. Minimally vegetated badlands are also scattered throughout the region.

The proposed project area is characterized by four vegetation communities, which are described below.

Sagebrush Shrubland

Majority of the proposed survey area was compromised of big sagebrush shrubland. The sagebrush shrubland vegetative community dominates 46 percent of the proposed survey area. Within the sagebrush shrublands of the proposed survey area, vegetative cover is approximately 45 to 65 percent.

The dominant plant species of this vegetation community within the survey area is big sagebrush. Other plant species included gambel oak, oneseed juniper, piñon pine, antelope bitterbrush (*Purshia tridentata*), banana yucca (*Yucca baccata*), greasewood (*Sarcobatus vermiculatus),* little sagebrush (*Artemisia arbuscula*), Mormon tea, narrowleaf yucca (*Yucca angustissima*), pale wolfberry (*Lycium pallidum*), plains pricklypear, rubber rabbitbrush (*Ericameria nauseosa*), shadscale, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), broom snakeweed, buckwheat (*Eriogonum microthecum*), longflower rabbitbrush (*Chrysothamnus depressus*), biscuitroot (*Cymopterus bulbosus*), Bracks fishhook cactus, claretcup cactus (*Echinocereus triglochidiatus*), cocklebur (*Xanthium strumarium*), hairy false goldenaster (*Heterotheca villosa*), Indian paintbrush (*Castilleja* sp.), lambsquarter (*Chenopodium album*), rock goldenrod (*Petradoria pumila*), Scarlet globemallow (*Sphaeralcea coccinea*), spiny phlox (*Phlox hoodii*), Alkali sacaton, blue grama, squirreltail, cheatgrass (*Bromus tectorum*), Indian ricegrass, James' galleta, needle and thread grass, sand dropseed (*Sporobolus cryptandrus*), six-weeks grama (*Boutelous barbata*), western wheatgrass, halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*).

Piñon-Juniper Woodland

The piñon-juniper woodlands are scattered along various sections of the proposed project area. The piñon-juniper woodland vegetative community comprises 11 percent of the proposed project area. Within the piñon-juniper woodlands of the proposed project area, vegetative cover is approximately 25 to 35 percent.

The dominant plant species of this vegetation community within the proposed project area are oneseed juniper and piñon pine. Other plant species included gambel oak, ponderosa pine (*Pinus ponderosa*), antelope bitterbrush, banana yucca, big sagebrush, mountain mahogony (*Cercocarpus montanus*), narrowleaf yucca, plains pricklypear, rubber rabbitbrush, broom snakeweed, buckwheat, hairy false goldenaster, rock goldenrod, blue grama, James' galleta, and Russian thistle.

Badland

The majority of the badlands vegetation community is located towards the eastern half, and one smaller portion of badlands occurs towards the far western end of the proposed project area. The badland vegetative community comprises 21 percent of the proposed project area. Within the badlands of the proposed project area, vegetative cover is approximately 5 to 15 percent.

The dominant plant species of this vegetation community within the proposed project area are four-winged saltbush (*Atriplex canescens*) and mountain mahogony. Other plant species included gambel oak, antelope bitterbrush, big sagebrush, greasewood, little sagebrush, narrowleaf yucca, rubber rabbitbrush, shadscale, yellow rabbitbrush, broom snakeweed, buchwheat, longflower rabbitbrush, cocklebur, hairy false goldenaster, lambsquarters, puncturevine (*Tribulus terrestris*), spiny phlox, wild onion (*Allium ascalonicum*), purple three-awn, and sand dropseed.

Reclaimed Sagebrush Shrubland

Majority of the proposed project area has existing disturbance that is composed of reclaimed sagebrush shrubland. The reclaimed sagebrush shrubland vegetative community comprises 22 percent of the proposed project area. Within the reclaimed sagebrush shrubland, vegetative cover is approximately 30 to 50 percent.

The dominant plant species of this vegetation community within the proposed project area is big sagebrush. Other plant species included blue grama, cheatgrass, false buffalograss (Munroa squarrosa), Indian ricegrass, six-weeks grama, western wheatgrass, and Russian thistle.

3.2.3. Noxious Weeds

No BLM-listed, invasive, non-native plant species of concern were identified during the survey (NRCS 2010; BLM 2003 3-34 – 3-35; NMDA 2010).

Halogeton, a Class-B noxious weed species listed by the New Mexico Department of Agriculture, is located along the south side of the proposed pipeline corridor. Class-B species are limited to portions of New Mexico (NMDA 2010).

Russian thistle was found within the entire proposed project area and was densest in the reclaimed sagebrush shrubland vegetation community. Although this species is not included on the federal, BLM, or NMDA noxious weed lists, it is known to outcompete desirable, native vegetation (Whitson, et al. 1992).

3.2.4. Terrestrial Wildlife

No prairie dog colonies have been recorded by the BLM-FFO within or adjacent to the proposed project area (BLM 2012b); the closest recorded colony is approximately 11 miles east of the proposed project area. No sign of prairie dogs was observed during the survey.

The following terrestrial wildlife species and/or sign were heard during the survey:

- American badger (*Taxidea taxus*)
- black-tailed jackrabbit (*Lepus californicus*)
- Botta's pocket gopher (*Thomomys bottae*) mounds
- canidae sp. tracks (species not identified)
- coyote (*Canis latrans*) tracks and scat
- desert cottontail (*Sylvilagus audubonii*)
- elk (*Cervus canadensis*) tracks and scat
- Harris's antelope squirrel (*Ammospermophilus harrisii*)
- mountain lion (*Puma concolor*) scat
- mule deer (*Odocoileus hemionus*) scat
- packrat (*Neotoma* sp.) midden
- unknown ground squirrel (*Marmotini* sp.) burrows
- unknown rodent burrows (species not identified)
- ferrel horse (*Equus ferus*)

3.2.5. Migratory Birds

The BLM-FFO has developed a list of priority birds of conservation concern. These birds have a known distribution in the BLM-FFO area and may be affected by various types of perturbations. These species, a brief description of their habitat, and an evaluation of their potential to occur within the proposed project area are provided in the table below.

Table 2. Migratory Birds with Potential to Occur in the BLM-FFO

Species Name	Habitat Associations	Potential to Occur in Proposed Project Area
Bendire's thrasher (*Toxostoma bendirei*)	On the Colorado Plateau, inhabits open sagebrush shrubland with scattered junipers; prefers sparse or degraded understory at lower elevations. This species avoids riparian areas and arroyos with dense shrub cover (New Mexico Partners in Flight [NMPIF] 2007).	POSSIBLE: Sagebrush shrublands within proposed project area provide potential habitat for this species.
Black-throated sparrow (*Amphispiza bilineata*)	Xeric habitats dominated by open shrubs with areas of bare ground. Commonly uses desert scrub habitat associated with washes, low hills, and alluvial fans. Avoids lowland desert floors and sinks. May occur higher, into piñon-juniper woodlands (NMPIF 2007).	POSSIBLE: Sagebrush shrublands within the proposed project area provide potential habitat for this species.
Brewer's sparrow (*Spizella breweri*)	Closely associated with sagebrush, preferring dense stands broken up with grassy areas (NMPIF 2007).	POSSIBLE: Sagebrush shrublands within the proposed project area provide potential foraging and nesting habitat for this species.
Gray vireo (*Vireo vicinior*)	In northern New Mexico, uses stands of piñon pine and Utah juniper at elevations 5,800 to 7,200 feet AMSL. Prefers open woodlands with a shrub component and mostly bare ground. Antelope bitterbrush, mountain mahogany, Utah serviceberry, and big sagebrush are often present. Broad, flat or gently sloped canyons are preferred. Occur in areas with rock outcroppings or near ridge tops (NatureServe 2012, NMPIF 2007).	POSSIBLE: Sagebrush shrublands within the proposed project area would not likely provide suitable habitat for this species.

Species Name	Habitat Associations	Potential to Occur in Proposed Project Area
Loggerhead shrike (*Lanius ludovicianus*)	Landscapes with widely spaced shrubs and low trees interspersed with short grasses, forbs, and bare grounds. Includes farm and pasture lands, grasslands, desert scrub, and savannahs. In New Mexico, associated with open country and short vegetation, including desert grasslands, shrublands, open woodlands, and juniper savannahs. Nests in shrubs (NMPIF 2007).	POSSIBLE: Open piñon-juniper woodlands within proposed project area provide potential habitat for this species.
Mountain bluebird (*Sialia currucoides*)	Open piñon-juniper woodlands, mountain meadows, and sagebrush shrublands; requires larger trees and snags for cavity nesting (NMPIF 2007).	KNOWN: Sagebrush shrublands and open piñon-juniper woodlands within proposed project area provide potential habitat for this species.
Mourning dove (*Zenaida macroura*)	Open woodland, forest edge, cultivated lands with scattered trees and bushes, parks and suburban areas, arid and desert country. Nests in trees or shrubs or on the ground (NatureServe 2012).	POSSIBLE: Sagebrush shrublands and open piñon-juniper woodlands within the proposed project area could provide suitable habitat for this species.
Sage sparrow (*Amphispiza belli*)	Associated with big sagebrush and other desert shrub or chaparral vegetation. Prefers semiopen areas with evenly spaced shrubs that are 2 to 6 feet high. May occupy pure stands of big sagebrush or areas with sagebrush interspersed with bitterbrush, saltbush, shadscale, rabbitbrush, or greasewood (NMPIF 2007).	POSSIBLE: Sagebrush shrublands within proposed project area provide potential habitat for this species.
Sage thrasher (*Oreoscoptes montanus*)	Shrub-steppe dominated by big sagebrush (NMPIF 2007).	POSSIBLE: Sagebrush shrublands within proposed project area provide potential habitat for this species.
Scaled quail (*Callipepla squamata*)	Brushy arroyos, cactus flats, sagebrush or mesquite plains, desert grasslands, Plains grasslands, and agricultural areas. Good breeding habitat has a diverse grass composition, with varied forbs and scattered shrubs (NMPIF 2007).	POSSIBLE: Sagebrush shrublands within proposed project area provide potential habitat for this species.
Swainson's hawk (*Buteo swainsoni*)	Breeds and forages in grasslands; shrublands; small, open woodlands; and agricultural areas. Nests are built in trees within this habitat (NMPIF 2007).	POSSIBLE: Sagebrush shrublands within proposed project area provide potential foraging habitat for this species.
Vesper sparrow (*Pooecetes gramineus*)	Open habitats, including old fields, shrub-steppe, grasslands, and cultivated croplands. Nests on the ground at the base of grass tussocks or forbs (NMPIF 2007).	UNLIKELY: Sagebrush shrublands within the proposed project area would not likely provide suitable habitat for this species.

Based on habitat and range, the potential exists for numerous migratory birds to occur within the proposed project area.

The following species were observed/heard during the survey:

- common raven (*Corvus corax*)
- dark-eyed junco (*Junco hyemalis*)
- golden eagle

- horned lark (*Eremophila alpestris*)
- juniper titmouse (*Baeolophus ridgwayi*)
- mountain bluebird
- northern flicker (*Colaptes auratus*)
- northern mockingbird (*Mimus polyglottos*)
- pinyon jay (*Gymnorhinus cyanocephalus*)
- red-tailed hawk (*Buteo jamaicensis*)
- sparrow (*Emberizidae* sp.)

4. RESULTS

4.1. USFWS-Listed Species

The USFWS lists nine Threatened, Endangered, or Candidate species with the potential to occur in San Juan County, eight species for Rio Arriba County, and seven species for Sandoval County, New Mexico (USFWS 2014)., The tables below describe these species along with their potential to occur within the proposed project area.

Table 3. USFWS-Listed Species with Potential to Occur in San Juan County, New Mexico

Species	USFWS Status	Occurrence Within Region	Habitat	Potential to Occur in Proposed Project Areas
Knowlton cactus (*Pediocactus knowltonii*)	Endangered	Known wild population is fenced and protected from disturbance (BLM 2003, 3-43).	Rolling, gravelly hills in piñon-juniper-sagebrush communities. Elevation 6,200 to 6,300 feet AMSL (New Mexico Rare Plant Technical Council [NMRPTC] 2011).	WOULD NOT OCCUR: Proposed project area is not within vicinity of known population. Elevation of proposed project area is above 6,300 feet AMSL.
Mancos milkvetch (*Astragalus humillimus*)	Endangered	All known BLM-FFO populations are within Hogback Area of Critical Environmental Concern (ACEC; BLM 2003, 3-43).	Sandstone rimrock ledges and mesa tops in Point Lookout sandstone. Occurs in cracks or eroded depressions. Elevation 5,000 to 6,000 feet (NMRPTC 2011).	WOULD NOT OCCUR: Proposed project area is not within vicinity of known population. Elevation of proposed project area is above 6,000 feet AMSL.
Mesa Verde cactus (*Sclerocactus mesae-verdae*)	Threatened	All known BLM-FFO populations are within Hogback ACEC (BLM 2003, 3-43).	Sparsely vegetated (less than 15 percent) salt desert scrub communities with mat saltbush (*Atriplex corrugata*) and Gardner's saltbush (*A. gardneri*). Prefers tops of hills or benches and slopes having clay-rich soils derived from Fruitland and Mancos shale formations with 0- to 100-percent igneous or sedimentary gravel and cobble. Elevation 4,900 to 5,500 feet AMSL (Hazelton 2012).	WOULD NOT OCCUR: Proposed project area is not within vicinity of known populations. Elevation of proposed project area is above 5,500 feet AMSL. No sparsely vegetated salt desert scrub communities within proposed project area.
FISH				

Species	USFWS Status	Occurrence Within Region	Habitat	Potential to Occur in Proposed Project Areas
Colorado pikeminnow (*Ptychocheilus lucius*)	Endangered with Designated Critical Habitat	Designated critical habitat within portions of San Juan River, beginning in Farmington and continuing downstream (BLM 2003, 3-43).	Portions of medium to large rivers (NatureServe 2012).	WOULD NOT OCCUR: No perennial water sources within or adjacent to proposed project area.
Razorback sucker (*Xyrauchen texanus*)	Endangered with Designated Critical Habitat	Known to occur in portions of San Juan River. None known to occur in BLM-FFO (BLM 2003, 3-43).	Portions of medium to large rivers and their impoundments (NatureServe 2012).	WOULD NOT OCCUR: No perennial water sources within or adjacent to proposed project area.
Zuni bluehead sucker (*Catostomus discobolus*)	Endangered with Proposed Critical Habitat	Headwater streams of the Little Colorado River; upper Río Nutria drainage in New Mexico (Probst et al. 2001)	Low velocity pools and pool-runs in portions of small to medium rivers (NatureServe 2012).	WOULD NOT OCCUR: No perennial water sources within or adjacent to proposed project area.
BIRDS				
Sprague's pipit (*Anthus spragueii*)	Candidate	Possible rare winter/migration occurrences (NMPIF 2007).	Breeds in native prairie and grassland habitats (NatureServe 2012).	WOULD NOT OCCUR: No native prairie or grasslands within or adjacent to proposed project area.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Endangered with Designated Critical Habitat	Summer/breeding & migration range (BLM 2003, 3-44).	Breeds in dense riparian habitat (NMPIF 2007).	WOULD NOT OCCUR: No riparian habitat within or adjacent to proposed project area.
Yellow-billed cuckoo (*Coccyzus americanus*)	Threatened with Proposed Critical Habitat	Possible rare summer/breeding occurrences (Sibley 2000).	Prefers open woodlands with clearings and low, dense, scrubby vegetation. In the southwestern U.S., associated with riparian woodlands dominated by cottonwood or mesquite. In New Mexico, native or exotic species may be used (NMPIF 2007).	WOULD NOT OCCUR: No riparian woodlands within or adjacent to proposed project area.

Two of these species (listed below) are also San Juan County USFWS-listed species and were included on Table 3 above. None of these species has the potential to occur within the proposed project areas.

- Southwestern willow flycatcher

- Yellow-billed cuckoo

Table 4: Federally listed species with potential to occur in Rio Arriba County, New Mexico

Species	Status	Occurrence Within Project Region	Habitat	Potential to Occur in Proposed Survey Area
AMPHIBIANS				
Jemez Mountains salamander (*Plethodon neomexicanus*)	Endangered with Designated Critical Habitat	Known extent of occurrence restricted to Jemez Mountains (NatureServe 2012).	Mixed conifer habitat with abundant rotted logs and surface rocks. Vegetation is dominated by fir, spruce, and ponderosa pine (NatureServe 2012).	WOULD NOT OCCUR: Proposed project area is not within the Jemez Mountains.
BIRDS				
Least tern (interior population) (*Sterna antillarum*)	Endangered	Few summer/breeding occurrences known in New Mexico; none known in BLM-FFO (NatureServe 2012).	Bare or sparsely vegetated sand or dried mudflats along coasts, rivers, or emergent wetlands (NatureServe 2012).	WOULD NOT OCCUR: No sand or mudflats occur within or adjacent to the proposed project area.
Mexican spotted owl (*Strix occidentalis lucida*)	Threatened with Designated Critical Habitat	Year-round range (Sibley 2000). Designated critical habitat is present within BLM-FFO Mexican Spotted Owl ACEC (BLM 2003).	Mixed conifer forests. Typically where unlogged, uneven-aged, closed-canopy forests occur in steep canyons (NatureServe 2012).	WOULD NOT OCCUR: No mixed conifer forests occur within or adjacent to the proposed project area.
MAMMALS				
Canada lynx (*Lynx canadensis*)	Proposed Threatened	Not known to occur in New Mexico (NatureServe 2012).	Boreal and montane regions dominated by coniferous or mixed forest with thick undergrowth. May also enter open forest, rocky areas, and tundra (NatureServe 2012).	WOULD NOT OCCUR: No boreal or montane habitat occurs within or adjacent to the proposed project area.
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	Endangered with proposed critical habitat	Possible isolated populations in New Mexico (NatureServe 2012).	Moist, lowland habitats including marshes, meadows, swamps, and streamsides (NatureServe 2012).	WOULD NOT OCCUR: No moist, lowland habitats within or adjacent to the proposed project area.

Four of these species (listed below) are also San Juan County and/or Rio Arriba County USFWS-listed species and were included on the Table above. None of these five species has the potential to occur within the proposed project area.

- Mexican spotted owl
- Southwestern willow flycatcher
- Yellow-billed cuckoo
- New Mexico meadow jumping mouse

Table 5: Federally listed species with potential to occur in Sandoval County, New Mexico

Species	Status	Occurrence Within Region	Habitat	Potential to Occur in Proposed Survey Area
FISH				
Rio Grande silvery minnow (*Hybognathus amarus*)	Endangered with Designated Critical Habitat	Not currently known to occur in region (NatureServe 2012).	Waters with slow to moderate flow in perennial sections of the Rio Grande River and associated irrigation canals (NatureServe 2012).	WOULD NOT OCCUR: No perennial water sources within the survey area.
AMPHIBIANS				
Jemez Mountains salamander (*Plethodon neomexicanus*)	Endangered with Designated Critical Habitat	Known extent of occurrence restricted to Jemez Mountains (NatureServe 2012).	Mixed conifer habitat with abundant rotted logs and surface rocks. Vegetation is dominated by fir, spruce, and ponderosa pine (NatureServe 2012).	WOULD NOT OCCUR: The survey area is not within the Jemez Mountains.

During the February, March, and April field surveys, no USFWS-listed species or appropriate habitat for such species was observed within the proposed project area.

4.2. New Mexico State-Listed Species

There are 19 State-listed species with the potential to occur in San Juan County, 15 State-listed species for Rio Arriba County, and 18 State-listed species for Sandoval County, New Mexico (NMRPTC 2011, New Mexico Department of Game and Fish 2013).

Four of these species (listed below) are also USFWS-listed species and were included on **Error! Reference source not found.** and/or migratory-listed species and were included on Table 2 above. One of these species, Gray vireo, has the potential to occur within the proposed project area.

- Knowlton cactus (Federally Endangered)
- Mancos milkvetch (Federally Endangered)
- Mesa Verde cactus (Federally Threatened)
- Colorado pikeminnow (Federally Endangered with designated critical habitat)
- Gray vireo (Migratory Bird)

Tables 6, 7, and 8 below describe the State-listed species and their potential to occur within the proposed project area.

Table 6: New Mexico State-Listed Species with Potential to Occur in San Juan County, New Mexico

Species	Status	Occurrence Within BLM-FFO Region	Habitat	Potential to Occur in Proposed Project Area
PLANTS				
Aztec gilia (*Aliciella formosa*)	Endangered	Known to occur within general region (BLM 2003, 3-45).	Salt desert scrub communities in Nacimiento Formation soils (NMRPTC 2011).	POSSIBLE: The proposed project area is within the BLM-FFO-designated "zone" for this species (BLM 2013a). The vegetation community within the proposed project area, however, is not desert scrub.
Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*)	Endangered	Known to occur within general region (BLM 2003, 3-45).	Salt desert scrub communities in Nacimiento Formation soils (NMRPTC 2011).	POSSIBLE: The proposed project area is within the BLM-FFO-designated "zone" for this species (BLM 2013a). The vegetation community within the proposed project area is not desert scrub.
Parish's alkali grass (*Puccinellia parishii*)	Endangered	Known to occur within general region (NMRPTC 2011).	Alkaline springs, seeps, and seasonally wet areas at the heads of drainages or on gentle slopes. Continuously damp soils late winter through spring. Elevation 2,600-7,200 feet AMSL (NMRPTC 2011).	WOULD NOT OCCUR: No alkaline springs, seeps, or seasonally wet area within proposed project area.
Zuni fleabane (*Erigeron rhizomatus*)	Endangered	Known to occur within general region (NMRPTC 2011).	Nearly barren, detrital, clay hillsides with soils derived from shales of the Chinle or Baca formations. Typically on north- or east-facing slopes in open piñon-juniper woodlands. Elevation 7,300-8,000 feet AMSL (NMRPTC 2011).	WOULD NOT OCCUR: No nearly barren, detrital, or clay hillsides with soils derived from the Baca formations found within proposed project area. Elevation of proposed project area is below 7,300 feet AMSL.
FISH				
Roundtail chub (*Gila robusta*)	Endangered	Rare in the San Juan River. May occur in the BLM River Tract ACEC area (BLM 2003, 3-46).	Portions of small to large rivers and large reservoirs (NatureServe 2012).	WOULD NOT OCCUR: No perennial water sources within or adjacent to proposed project area.
BIRDS				
Baird's sparrow (*Ammodramus bairdii*)	Threatened	Possible rare occurrences during winter (NMPIF 2007, Sibley 2000).	Winters in areas of dense and expansive grasslands with a minor shrub component (NMPIF 2007).	WOULD NOT OCCUR: No grasslands with a minor shrub component within or adjacent to proposed project area.

Species	Status	Occurrence Within BLM-FFO Region	Habitat	Potential to Occur in Proposed Project Area
Bald eagle (*Haliaeetus leucocephalus alascanus*)	Threatened	Winter range (Sibley 2000). Known to migrate through and winter in general region (BLM 2003, 3-43).	Wintering areas are commonly associated with open water, though eagles may use habitat with little or no open water if other food resources (such as carrion) are readily available. Winter roost sites may be up to 20 miles from food resources (NatureServe 2012).	UNLIKELY: The nearest appropriate perennial water source is more than 20 miles from proposed project area. Therefore, it is unlikely that a bald eagle would utilize proposed project area as foraging habitat.
Broad-billed hummingbird (*Cyanthus latirostris magicus*)	Threatened	Unlikely to occur in northwestern New Mexico (NMPIF 2007, Sibley 2000).	Riparian areas dominated by sycamore or cottonwood and mesquite (NMPIF 2007).	WOULD NOT OCCUR: No riparian areas within or adjacent to proposed project area.
Brown pelican (*Pelecanus occidentalis carolinensis*)	Endangered	Unlikely to occur in northwestern New Mexico (NatureServe 2012, Sibley 2000).	Mainly coastal waters (NatureServe 2012).	WOULD NOT OCCUR: No coastal waters within or adjacent to proposed project area.
Common Black-Hawk (*Buteogallus anthracinus*)	Threatened	Unlikely to occur in northwestern New Mexico (NMPIF 2007, Sibley 2000).	Riparian forests (NMPIF 2007).	WOULD NOT OCCUR: No riparian forests within or adjacent to proposed project area.
Gray vireo (*Vireo vicinior*)	Threatened	Summer/breeding range (NMPIF 2007, Sibley 2000). Common in region (BLM 2003, 3-46).	Piñon-juniper woodlands or juniper savannah with a shrub component. In northwestern New Mexico, broad-bottomed, flat or gently sloped canyons; areas with rock outcroppings; or near ridgetops (NMPIF 2007).	WOULD NOT OCCUR: No piñon-juniper woodlands, juniper savannahs, canyons, or rock outcroppings within or adjacent to proposed project area.
Least tern (*Sterna antillarum athalassos)*	Endangered	Unlikely to occur in northwestern New Mexico (NMPIF 2007, Sibley 2000).	Bare or sparsely vegetated sand or dried mudflats along coasts, rivers, or emergent wetlands (NatureServe 2012).	WOULD NOT OCCUR: No coasts, rivers, or wetlands within or adjacent to proposed project area.
Peregrine falcon (*Falco peregrinus tundrius; anatum*)	Threatened	Summer/ breeding range (Sibley 2000). Known to nest in region (BLM 2003).	Rugged, semi-open to wooded areas in montane regions. Areas with rocky cliffs, outcrops, and canyons that are at least 30 feet high and often near water. In New Mexico, typically nests on cliff ledges (NMPIF 2007, Wheeler 2003).	POSSIBLE: Rocky cliffs, outcrops, and canyons within the vicinity of proposed project area. There are no recorded peregrine falcon nests within 10 miles of the proposed project area and no perennial water source (BLM 2012c).

Species	Status	Occurrence Within BLM-FFO Region	Habitat	Potential to Occur in Proposed Project Area
MAMMALS				
Spotted bat (*Euderma maculatum*)	Threatened	Permanent resident (NatureServe 2012).	Various habitats, including deserts, open ponderosa pine (*Pinus ponderosa*) forests, piñon-juniper woodland, canyon bottoms, open pasture, and hayfields. Roosts in caves and in cracks and crevices or canyons or cliffs (NatureServe 2012).	WOULD NOT OCCUR: No foraging or roosting habitat present within or adjacent to proposed project area.

Twelve of these species (listed below) are also San Juan County, Rio Arriba, and/or Sandoval USFWS-listed species and/or San Juan County State-listed species and were included on Tables 3, 4, or 5 above.

- Jemez Mountains salamander (Federally Endangered)
- Least tern (Federally Endangered)
- Southwestern willow flycatcher (Federally Endangered)
- New Mexico jumping mouse (Federally Endangered)
- Baird's sparrow (San Juan County, State Threatened)
- Bald eagle (San Juan County, State Threatened)
- Brown pelican (San Juan County, State Threatened)
- Common black-hawk (San Juan County, State Threatened)
- Gray vireo (Migratory Bird)
- Peregrine falcon (San Juan County, State Threatened)
- New Mexico meadow jumping mouse (Federally Endangered)
- Spotted bat (San Juan County, State Threatened)

Table 7: New Mexico State-Listed Species with Potential to Occur in Rio Arriba County, New Mexico

Species	State Status	Occurrence Within Project Region	Habitat	Potential to Occur in Proposed Project Area
AMPHIBIANS				
Boreal toad (*Anaxyrus boreas*)	Endangered	Potentially occurs in San Juan Mountains within north-central Rio Arriba County, specifically Canjilon Lakes, Trout Lakes, and Lagunitas Lakes (Degenhardt, Painter, and Price 1996).	High elevation lakes, slow-moving streams, or marshy areas within subalpine forests (Degenhardt, Painter, and Price 1996).	WOULD NOT OCCUR: No subalpine forests within or adjacent to proposed project area.
BIRDS				

- Common black-hawk (San Juan County and Rio Arriba State Threatened)
- Gray vireo (Migratory Bird)
- Peregrine falcon (San Juan County and Rio Arriba State Threatened)
- American marten (Rio Arriba County State Threatened)
- New Mexico meadow jumping mouse (Federally Endangered)
- Spotted bat (San Juan County and Rio Arriba State Threatened)

Table 8: New Mexico State-Listed Species with Potential to Occur in Sandoval County, New Mexico

Species	State Status	Occurrence Within Project Region	Habitat	Potential to Occur in Proposed Project Area
PLANTS				
Parish's alkali grass *(Puccinellia parishii)*	Endangered	Known to occur within general region (NMRPTC 2011).	Alkaline springs, seeps, and seasonally wet areas at the heads of drainages or on gentle slopes. Continuously damp soils late winter through spring. Elevation 2600-7200 feet (NMRPTC 2011).	WOULD NOT OCCUR: No continually damp soils within the proposed project area.
MOLLUSCS				
Paper pondshell *(Utterbackia imbecillis)*	Endangered	Specimens have been collected within Sandoval County.	Mud, sand, and gravel substrates of freshwater lakes and rivers (Taylor et al. 1985)	WOULD NOT OCCUR: No freshwater lakes or rivers within proposed project area.
Wrinkled marshsnail *(Stagnicola caperata)*	Endangered	Known to occur only in the Cerro la Jara area of the Jemez Mountains (NMDGF 2013).	Vegetated ditches, marshes, streams, and ponds that are typically seasonally dry (NMDGF 2013).	WOULD NOT OCCUR: No ditches, marshes, streams, or ponds within proposed project area.
BIRDS				

Species	State Status	Occurrence Within Project Region	Habitat	Potential to Occur in Proposed Project Area
Boreal owl (*Aegolius funereus*)	Threatened	Unlikely to occur in northwestern New Mexico. Occurs along north-northeast boundary of Rio Arriba County (Sibley 2000).	High-elevation, subalpine, coniferous forests (spruce-fir forests) (NMPIF 2007).	WOULD NOT OCCUR: Proposed project area is not located within or adjacent to subalpine habitat.
White-tailed ptarmigan (*Lagopus leucura*)	Threatened	Unlikely to occur in northwestern New Mexico. Occurs along north-northeast boundary of Rio Arriba County (Sibley 2000).	In New Mexico, alpine tundra and timberline, mainly above 10,000 feet AMSL (NatureServe 2012).	WOULD NOT OCCUR: No alpine habitat within or adjacent to proposed project area.
MAMMALS				
American marten (*Martes americana origenes*)	Threatened	Unlikely to occur in northwestern New Mexico. Occurs along north-northeast boundary of Rio Arriba County (NatureServe 2012).	Dense deciduous forests and mixed coniferous forests. In Rocky Mountains, associated with old-growth forests (NatureServe 2012).	WOULD NOT OCCUR: No alpine habitat within or adjacent to proposed project area.
Spotted bat (*Euderma maculatum*)	Threatened	Permanent resident (NatureServe 2012).	Various habitats, including deserts, open ponderosa pine forests, piñon-juniper woodland, canyon bottoms, open pasture, and hayfields. Roosts in caves and in cracks and crevices or canyons or cliffs (NatureServe 2012).	POSSIBLE: Proposed project area is located near a wide-bottomed canyon valley. No roost sites within or adjacent to survey area.

Eleven these species (listed below) are also San Juan County and/or Rio Arriba County USFWS-listed species and/or San Juan County and/or Rio Arriba State-listed species and were included on the tables above.

- Rio Grande silvery minnow (Federally Endangered with critical habitat)
- Jemez Mountains salamander (Federally Endangered)
- Baird's sparrow (San Juan County and Rio Arriba County State Threatened)
- Bald eagle (San Juan County and Rio Arriba State Threatened)
- Broad-billed hummingbird (San Juan County State Threatened)
- Brown pelican (San Juan County and Rio Arriba State Threatened)

Species	State Status	Occurrence Within Project Region	Habitat	Potential to Occur in Proposed Project Area
Costa's hummingbird (*Calypte costae*)	Threatened	Unlikely to occur in northwestern New Mexico (NMPIF 2007).	Desert scrub. Prefers areas along washes, canyons, and rocky slopes (NMPIF 2007).	WOULD NOT OCCUR: The ephemeral washes in and adjacent to the survey area do not provide suitable riparian habitat for the species.
Neotropic cormorant (*Phalacrocorax brasilianus*)	Threatened	Possible rare occurrences in northwestern New Mexico (NMDGF 2013, NMPIF 2007).	Wetlands (NMPIF 2007).	WOULD NOT OCCUR: No wetlands within or adjacent to proposed project area.

Four State-listed species (Aztec gilia, Brack's fishhook cactus, Peregrine falcon, and spotted bat) have the potential to occur within the proposed project area. Brack's fishhook cactus is known to occur within the proposed project area. This species are discussed in Section 5 (Discussion and Recommendations).

4.3. BLM-Listed Species

BLM-designated SSS include BLM Sensitive Species and BLM-FFO Special Management Species (SMS); BLM 2011a, BLM 2011b, BLM 2011c, BLM 2012a). There are 23 BLM SSS for the BLM-FFO area.

Seven of these species (listed below) are included on the USFWS and/or State lists. Four of these aforementioned species (Aztec gilia, Brack's fishhook cactus, peregrine falcon, and spotted bat) have the potential to occur within the proposed project area.

- Aztec gilia (Sensitive and SMS)
- Brack's fishhook cactus (Sensitive and SMS)
- Bald eagle (SMS)
- Peregrine falcon (SMS)
- Western yellow-billed cuckoo (Sensitive and SMS)
- New Mexico meadow jumping mouse (Sensitive and SMS)
- Spotted bat (Sensitive)

The remaining species and their potential to occur within the proposed project area are described in

below.

Table 9. BLM SSS with Potential to Occur within BLM-FFO

Species	Status	Occurrence Within Region	Habitat	Potential to Occur in Proposed Project Area
PLANTS				
Acoma fleabane (*Erigeron acomanus*)	Sensitive	Not known to occur within BLM-FFO. Only known to occur in Bluewater Canyon (Valencia County) and north of Prewitt (McKinley County) (BLM 2012a).	Piñon-juniper woodland on sandy slopes and benches beneath sandstone cliffs of the Entrada Sandstone Formation. Elevation: 6900 to 7100 feet AMSL (BLM 2012a).	UNLIKELY: Not known to occur within BLM-FFO. Open piñon-juniper woodlands may provide suitable habitat within proposed project area.
Grama grass cactus (*Sclerocactus papyracanthus*)	Sensitive	Not known to occur within BLM-FFO (BLM 2012a).	Desert grasslands or open piñon-juniper woodlands (BLM 2012a).	UNLIKELY: Not known to occur within BLM-FFO. Open piñon-juniper woodlands may provide suitable habitat within proposed project area.
Mancos saltbush (*Proatriplex pleiantha*)	Sensitive	Known to occur within BLM-FFO (BLM 2012a).	Desert badlands. Saline clay soils of the Mancos and Fruitland Formations (BLM 2012a).	UNLIKELY: Desert badlands and soils present within proposed project area. However, the formations are absent.
San Juan milkweed (*Asclepias sanjuanensis*)	Sensitive	Known to occur within BLM-FFO (BLM 2012a).	Juniper savannah or Great Basin desert scrub. Sandy loam soils. Usually in disturbed areas (BLM 2012a).	WOULD NOT OCCUR: No juniper savannah or Great Basin desert scrub habitats within proposed project area.
BIRDS				
Bendire's thrasher (*Toxostoma bendirei*)	Sensitive	Summer range (Sibley 2000). Known to occur within BLM-FFO (BLM 2011a).	Sparse desert shrublands, degraded grasslands, and open woodlands with scattered shrubs. On the Colorado Plateau, open sagebrush shrublands with scattered junipers. Avoids riparian areas and arroyos with dense shrub cover (NMPIF 2007).	POSSIBLE: Sagebrush shrublands and scattered junipers within proposed project area provide potential foraging and nesting habitat for this species.

Species	Status	Occurrence Within Region	Habitat	Potential to Occur in Proposed Project Area
Chestnut-collared longspur (*Calcarius ornatus*)	Sensitive	BLM-FFO is on periphery of range (BLM 2011a). Could migrate through BLM-FFO or occur as a non-breeding resident (Sibley 2000, NatureServe 2012).	Level to rolling mixed-grass and short-grass uplands. In drier habitats, also uses moist lowlands. Prefers open prairie and avoids excessively shrubby areas. Avoids areas with dense litter accumulations (NatureServe 2012).	WOULD NOT OCCUR: No mixed-grass, short-grass, or moist lowlands within or adjacent to proposed project area.
Ferruginous hawk (*Buteo regalis*)	Sensitive & SMS	Year-round range (NMPIF 2007). Known to nest in BLM-FFO (BLM 2012c).	Open areas with broad expanses of prairie grassland or shrub-steppe vegetation, areas with low to moderate agricultural coverage, transitional edges between grasslands and piñon-juniper woodlands, sagebrush shrublands, and desert scrub (NMPIF 2007, NatureServe 2012). Nests in elevated locations on the ground (if in grasslands), in isolated tree stands, on rock outcrops/spires, or on utility poles (NMPIF 2007).	POSSIBLE: Sagebrush shrublands and open piñon-juniper woodlands within proposed project area provides potential foraging habitat for this species. Appropriate nesting sites found within the vicinity of the proposed project area.
Golden eagle	SMS	Year-round range (Sibley 2000). Known to nest in BLM-FFO (BLM 2012c).	Open to semi-open country with elevated perches, including grasslands, prairies, open woodlands, shrublands, and barren areas. Prefers hilly or montane regions. Nests on rock ledges on cliffs or in large trees (NatureServe 2012, NMPIF 2007, Wheeler 2003).	KNOWN: Nest located on rocky cliffs approximately 0.2 mile from the proposed project area. The vegetation communities within proposed project area provides potential foraging habitat for this species.

Species	Status	Occurrence Within Region	Habitat	Potential to Occur in Proposed Project Area
Mountain plover (*Charadrius montanus*)	SMS	Possible rare summer/breeding occurrences (Sibley 2000). Historic breeding records in BLM-FFO (BLM 2003, 3-43).	Large, flat grasslands with sparse, short vegetation and bare ground. Also uses semi-desert scrub dominated by short saltbush and sagebrush. Often associated with prairie dog colonies. In New Mexico, nests are often in overgrazed grassland patches or on gravelly ground with very short cover and scattered shrubs interspersed with bare areas (NMPIF 2007).	UNLIKELY: Bare ground and sagebrush habitat within proposed project area. However, there are no prairie dog colonies within 11 miles of the proposed project area.
Pinyon jay (*Gymnorhinus cyanocephalus*)	Sensitive	Year-round range (Sibley 2000). Known to occur within BLM-FFO (BLM 2011a).	Piñon-juniper woodlands. Occasionally areas dominated by ponderosa pine, sagebrush, or chaparral (NMPIF 2007).	KNOWN: Pinyon jays were seen during the field surveys of the proposed project area.
Prairie falcon (*Falco mexicanus*)	SMS	Year-round range (NMPIF 2007). Known to nest in BLM-FFO (BLM 2012c).	Arid, very open areas with short grass or scrub vegetation. Nests on cliffs at least 20 feet high. Breeding cliffs may be within semi-open to dense woodlands several miles from open foraging habitat (Wheeler 2003).	POSSIBLE: Areas of disturbance with short vegetation, bare ground, and cliffs surrounded with open piñon-juniper woodlands within and adjacent to proposed project area. However, no large grasslands exist in the vicinity of proposed project area.
Western burrowing owl (*Athene cunicularia*)	Sensitive & SMS	Summer/breeding range (Sibley 2000). Known to occur within BLM-FFO (BLM 2003, 3-47).	Open, treeless grasslands and sometimes other open areas (such as vacant lots). Nests in abandoned burrows, such as those dug by prairie dogs (NatureServe 2012).	WOULD NOT OCCUR: No open, treeless grasslands or prairie dog colonies located within or adjacent to proposed project area.
MAMMALS				
Cebolleta pocket gopher (*Thomomys bottae [umbrinus] paguatae*)	Sensitive	Currently known only to occur in Cibola County. Not known to occur within BLM-FFO (BLM 2011b).	Riparian habitat or uplands with large sandstone cliffs and juniper, piñon pine, and sagebrush (BLM 2011b).	UNLIKELY: Proposed project area is not within known range of this species.

Species	Status	Occurrence Within Region	Habitat	Potential to Occur in Proposed Project Area
Gunnison's prairie dog (*Cynomys gunnisoni*)	Sensitive	Known to occur within BLM-FFO (BLM 2011b).	Grasslands and shrublands (BLM 2011b). Often scattered junipers and pines (NatureServe 2012).	WOULD NOT OCCUR: There are no recorded or observed prairie dog colonies within or adjacent to proposed project area.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Sensitive	Known to occur within BLM-FFO (BLM 2011b).	Desert scrub, desert mountains, oak-woodlands, piñon-juniper woodlands, and coniferous forests. Roost mostly in caves, mines, or abandoned buildings (BLM 2011b; Gruver and Keinath 2003).	UNLIKELY: Minimal foraging habitat within or adjacent to proposed project area.

Nine BLM SSS (Aztec gilia, Bendire's thrasher, Brack's fishhook cactus, Ferruginous hawk, golden eagle, peregrine falcon, pinyon jay, prairie falcon, and spotted bat) have the potential to occur or are known to occur within the proposed project area. These species are discussed in Section 5 (Discussion and Recommendations).

5. DISCUSSION AND RECOMMENDATIONS

More than 4 acres of migratory bird breeding habitat would be cleared as a result of the proposed project area. If vegetation-clearing activities would occur during migratory bird breeding season (May 15 through July 31), a migratory bird nest survey should take place one to two days prior to construction. This survey should be conducted by a BLM-FFO-approved biologist using BLM-FFO protocol. If active nests are located within the proposed project area, the BLM-FFO biologist should be notified and project activities should not occur until fledging has occurred. If postponement is not an option, the operator should contact the USFWS's Migratory Bird Permit Office regarding permitting.

The proposed project would not result in the depletion of perennial water resources in SSS habitat. Therefore, the proposed project area would not affect special status fish species outside of the proposed project area.

The potential does not exist for USFWS-listed species to occur within the proposed project area.

Nine BLM- and State-listed SSS are known to occur or have the potential to occur within the proposed project area. Species descriptions, potential impacts, and mitigation are discussed further below.

5.1. Aztec Gilia and Brack's Fishhook Cactus

5.1.1. Habitat Description and Availability

Aztec gilia and Brack's fishhook cacti occur in salt desert scrub habitat within Nacimiento Formation soils (NMRPTC 2011). Although these species were once thought to occur between 5,000 and 6,400 feet AMSL (NMRPTC 2011), the newly designated BLM habitat "zone" for these species includes elevations that are considerably greater than 6,400 feet (BLM 2013a).

Appropriate habitat for these species is present throughout the badland portion of the proposed project area. However, Brack's fishhook cacti were also found in the sagebrush shrubland, open piñon-juniper, and reclaimed sagebrush shrubland vegetation communities.

Aztec Gilia

No Aztec gilia were identified during the surveys of the proposed project area. However, the surveys were conducted in February, March, and early April, outside of the blooming period (late April to mid-June) for this species; based on the small size of Aztec gilia and the timing of the survey, it is possible that additional individuals could have been overlooked during the surveys.

Brack's Fishhook Cactus

Approximately sixty-seven (67) Brack's fishhook cacti were identified during the surveys of the proposed project area. Sixty-five (65) of these cacti were within the boundaries of the proposed project area. The surveys were conducted in February, March, and early April, outside of the blooming period (late April to mid-June) for this species. Based on the small size of Brack's fishhook cacti and the timing of the survey, it is possible that additional individuals could have been overlooked during the surveys.

5.1.2. Potential Impacts and Mitigation

The proposed project would result in the disturbance of up to 88.6 acres of Aztec gilia/Brack's fishhook cactus habitat. Of this, all of the proposed project area would be reclaimed and re-vegetated. The reclaimed acreage could become populated by Aztec gilia and Brack's fishhook cacti in the future, although the likelihood of these species becoming reestablished in a recently disturbed area is unlikely.

Aztec Gilia

As no Aztec gilia were identified during the surveys, no direct impacts to individuals are anticipated as a result of the proposed project area. However, it is possible that Aztec gilia individuals that were overlooked during the surveys could be destroyed by the proposed project.

Brack's Fishhook Cactus

Under BLM-FFO guidance and following BLM-FFO protocol, the BLM-FFO will recommend Brack's Fishhook transplant procedures, if any, upon review of this document. Because the success of transplanting these individuals cannot be determined for several years, the direct impacts of the proposed project on these Brack's fishhook cacti is not yet known.

5.2. Bendire's Thrasher

5.2.1. Habitat Description and Availability

The Bendire's thrasher occurs in New Mexico during the summer/breeding season. In New Mexico, the thrasher breeds in scattered locations within the central and western portions of the state. This species typically inhabits sparse desert shrublands and degraded grasslands. It may also be found in open woodlands with scattered shrubs. On the Colorado Plateau, this species can be found in sagebrush shrublands with scattered junipers. It may use vegetation around human habitation and agricultural areas (NMPIF 2007). The Bendire's thrasher does not use areas with dense vegetation, such as riparian woodlands, although it may use the edges of such habitats. Nests are placed in low trees, shrubs, or cacti; nests are usually 3 to 5 feet off of the ground, but could be less than 2 feet to more than 11 feet off of the ground (NatureServe 2012).

Within the proposed project area, the Bendire's thrasher could potentially use the shrublands and open portions of the piñon-juniper woodlands for foraging and nesting. No sign of Bendire's thrashers was identified during the surveys.

5.2.2. Potential Impacts

If the vegetation-clearing phase of the project would occur during migratory bird breeding season, a pre-construction migratory bird nest survey would take place. If active nests are located during the survey, construction should not begin until birds have fledged or until the nest has been otherwise mitigated (as determined by the USFWS). Therefore, no eggs, nestlings, or active nests should be directly impacted by the proposed project area.

Due to the mobility of adult birds, it is unlikely that adult birds would be directly impacted by the proposed project area.

The proposed project area would result in the disturbance of 88.6 acres of potential foraging and nesting habitat for this species. Of this, all of the acreage would be reclaimed after construction. The reclaimed area could potentially be used by birds for foraging and/or nesting. Surrounding the proposed project area, there is similar, available foraging habitat for these species.

Audial and visual disturbances associated with the proposed project area could temporarily deter these species from utilizing the proposed project area and immediately adjacent lands.

5.3. Pinyon Jay

5.3.1. Pinyon Jay

Pinyon jays may occur in the BLM-FFO region year-round. This bird species inhabits piñon-juniper woodlands and has a strong association with piñon pine trees. Pinyon jays also have the potential to occur in areas dominated by ponderosa pine, sagebrush, or chaparral vegetation. During the pinyon jay summer breeding/nesting season (mid-February through late summer/fall), this bird species is highly social and breeds in large breeding colonies. The colonial nesting sites are typically located in dense, mature stands of piñon-juniper woodlands (NMPIF 2007).

Within the proposed project area, pinyon jays used the shrublands and woodlands for foraging, and piñon-juniper woodlands for nesting possibly. Pinyon jays were identified during the field surveys of the proposed project area.

5.3.2. Potential Impacts

If the vegetation-clearing phase of the project would occur during migratory bird breeding season, a pre-construction migratory bird nest survey would take place. If active nests are located during the survey, construction should not begin until birds have fledged or until the nest has been otherwise mitigated (as determined by the USFWS). Therefore, no eggs, nestlings, or active nests should be directly impacted by the proposed project area.

Due to the mobility of adult birds, it is unlikely that adult birds would be directly impacted by the proposed project area.

The proposed project area would result in the disturbance of 88.6 acres of potential foraging and nesting habitat for these species. Of this, all of the acreage would be reclaimed after construction. The reclaimed area could potentially be used by birds for foraging or nesting. Surrounding the proposed project area, there is similar, available foraging habitat for these species.

Audial and visual disturbances associated with the proposed project area could temporarily deter these species from utilizing the proposed project area and immediately adjacent lands.

5.4. Ferruginous Hawks, Peregrine Falcons, and Prairie Falcons

5.4.1. Habitat Description and Availability

Ferruginous Hawk

Ferruginous hawks may occur in the BLM-FFO region year-round. These raptors occur in open areas with broad expanses of prairie grassland or shrub-steppe vegetation. Ferruginous hawks use areas with low to moderate (less than 50-percent) agricultural coverage. Transitional edge habitats between grasslands and juniper savannah or piñon-juniper woodland are also used (NMPIF 2007). Sagebrush and desert scrub may also be used by ferruginous hawks (NatureServe 2012). The terrain within ferruginous hawk habitat can include flatlands, gently rolling hills, large hills, and badlands. The preferred habitat for this species usually includes trees, buttes, large boulders, or rock spires (Wheeler 2003). Ferruginous hawks typically avoid high elevations, forest interiors, narrow canyons, and areas with intensive agriculture or human activity (NatureServe 2012, NMPIF 2007). In New Mexico, nesting typically occurs in isolated tree stands, on rock spires, or on rock outcrops; utility poles or artificial platforms are sometimes used for nesting. In the BLM-FFO region, nesting often occurs on rock spires (NMPIF 2007).

The sagebrush shrubland and open piñon-juniper vegetation communities within the proposed project area could potentially be used for foraging by ferruginous hawks. Nesting habitat is also available within the vicinity of the proposed project area. The nearest recorded ferruginous hawk nest is approximately 11.7 miles west, northwest of the proposed project area (BLM 2012c). No sign of ferruginous hawks were observed during the field surveys.

Peregrine Falcon

American peregrine falcons may be found in the San Juan Basin during the breeding season (Sibley 2000). Generally, peregrine falcons inhabit open areas, such as steppe, mountains, open forests, and human population centers (NatureServe 2012). During the summer, in the interior U.S., this species can often be found in rugged, semi-open to wooded areas in montane regions. The preferred nesting habitat for this falcon species consists of ledges or holes along rocky cliffs, rock outcrops, and canyons (greater than 30 feet high) adjacent to lakes, rivers, and/or streams. Peregrine falcons will also nest in open bogs, tree hollows, and man-made structures in close proximity to water. In the San Juan Basin, nests are typically found on ledges of vertical rocky cliffs (NatureServe 2012, Wheeler 2003).

The sagebrush shrubland and open piñon-juniper vegetation communities within the proposed project area could potentially be used for foraging by Peregrine falcons. Nesting habitat is also available within the vicinity of the proposed project area. The nearest recorded peregrine falcon nest is approximately 10 miles north, northwest of the proposed project area (BLM 2012c). No sign of peregrine falcons was observed during the survey.

Prairie Falcon

Prairie falcons may occur in the BLM-FFO region year-round. These raptors inhabit arid, very open areas, especially mountainous, steppe, plains, or prairie habitats (NatureServe 2012). During the summer, this species prefers areas with cliff formations that are at least 20 feet high. Locally, prairie falcons utilize short grass or scrub vegetation communities (Wheeler 2003). They prefer areas with low vegetation height and large areas of bare ground (NatureServe 2012). Prairie falcons nest on cliffs along buttes, hillside escarpments, or canyons. Cliffs used for nesting are typically located in semi-open regions with scattered conifer trees; however, on occasion, nesting sites are amidst dense conifer woodlands several miles from open foraging habitat (Wheeler 2003). On occasion, trees, utility poles, buildings, and steep-sided arroyos are used for nesting (NMPIF 2007). Winter foraging habitat is often the same as summer habitat but without a requirement for cliffs (Wheeler 2003). During the winter, prairie falcons will also forage within agricultural cropland (NatureServe 2012).

The sagebrush shrubland and open piñon-juniper vegetation communities within the proposed project area could potentially be used for foraging by prairie falcons. Nesting habitat is also available within the vicinity of the proposed project area. The nearest recorded prairie falcon nest is approximately 17.5 miles northeast of the proposed project area (BLM 2012c).No sign of prairie falcons was observed during the surveys.

5.4.2. Potential Impacts

There are rocky cliff, outcrops, and canyons closely surrounding the proposed project area, especially near the northeast end of the proposed project area. Audial and visual disturbances associated with the proposed project area could temporarily deter these species from utilizing the proposed project area and immediately adjacent lands.

The proposed project area would result in the disturbance of 88.6 acres of foraging habitat for these species. Of this, all of the acreage would be reclaimed after construction of the proposed project. These reclaimed areas could be used by raptors for foraging. Surrounding the proposed project area, there is similar, available foraging habitat for these raptors.

5.5. Golden Eagles

Golden eagles may be found in the BLM-FFO region year-round. These raptors occur in open to semi-open country, including open wooded areas, grasslands, shrublands, or barren areas. They prefer hilly or mountainous areas with elevated perches (NMPIF 2007, NatureServe 2012, and Wheeler 2003). Golden eagles may also be found in areas with light agricultural use, but rarely inhabit rural areas. During the breeding season, these eagles are primarily found in areas with mountain cliffs or canyons (NMPIF 2007). Nesting habitat for golden eagles consists of embankments or cliffs and/or flat to moderate areas with scattered large trees (Wheeler 2003). Dense forests are avoided for nesting. In New Mexico, most nests are within steep-walled mountain canyons (NMPIF 2007). During the summer, golden eagles may be found above timberline. During the winter, they are typically found below timberline and may forage in moderate agricultural areas (Wheeler 2003).

There is a known golden eagle nest within 0.2 mile of the proposed project area in the Lybrook Fossil Area, a rocky cliff, outcrop, and canyon zone. The nest was active with a male and female during the initial field surveys in February and March 2015. On April 28, 2015, the golden eagle nest appeared to be abandoned. On May 3, 2015 abandonment of the nest was confirmed. NCI biologist Sarah Griffin observed the area directly below the golden eagle nest for evidence of golden eagle eggshell fragments and none where found.

5.5.1. Potential Impacts and Mitigation

The proposed project would result in the disturbance of 88.6 acres of potential foraging habitat for these species. Of this, all of the acreage would be reclaimed after construction of the proposed project area. The reclaimed area could be used by raptors for foraging. Surrounding the proposed project area, there is similar, available foraging habitat for these raptors.

Since the male and female golden eagle abandoned their nest, no mitigation is necessary.

Audial and visual disturbances associated with the proposed project could temporarily deter these species from utilizing the proposed project area and immediately adjacent lands.

5.6. Spotted Bats

5.6.1. Habitat Description and Availability

Spotted bats, which are nocturnal, are a permanent resident of the BLM-FFO area. This bat species inhabits various habitat types, including deserts, open ponderosa pine forests, piñon-juniper woodlands,

canyon bottoms, open pastures, and hayfields. Roosting habitat for spotted bats consists of caves, cracks, and crevices along canyon or cliff walls (Nature Serve 2012).

The sagebrush shrubland and open piñon-juniper vegetation communities within the proposed project area could potentially be used for foraging by prairie falcons. There is available roosting habitat provided within 0.2 miles of the proposed project area in the rocky cliffs, outcrops, and canyons. No sign of spotted bats was observed during the surveys.

5.6.2. Potential Impacts

The proposed project would result in the disturbance of 88.6 acres of potential foraging habitat for this species. Of this, all of the acreage would be reclaimed after construction of the proposed project area. The reclaimed area could be used by spotted bats for foraging. Roosting sites would not be directly impacted by the proposed project area and adult bats are highly mobile. Therefore, no direct impacts to spotted bats would be expected as a result of the proposed project area.

Audial and visual disturbances associated with the proposed project could temporarily deter this species from utilizing the proposed project area and immediately adjacent lands.

6. CERTIFICATION

To the best knowledge of NCI, the proposed project, with the successful implementation of mitigation measures, would not violate any provisions of the Endangered Species Act of 1973, as amended. The proposed project area would comply with the guidance outlined in BLM Manual 6840 regarding SSS Management (BLM 2008). Conclusions are based on actual field examinations and are correct to the best of my knowledge.

Signature of Field Biologist: Sarah Cliff Date: 06/11/2015

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Durango, Colorado 81301
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7. REFERENCES

Bureau of Land Management (BLM). 2003. Farmington Proposed Resource Management Plan and Final Environmental Impact Statement. Farmington, New Mexico: BLM-FFO.

--. 2008. BLM Manual 6840: Special Status Species Management.

--. 2011a. BLM New Mexico Sensitive Birds List. Revised August 2011.

--. 2011b. BLM New Mexico Sensitive Mammals List. Revised July 2011.

--. 2011c. BLM New Mexico Sensitive Molluscs, Crustaceans, and Arthropods List. Revised August 2011.

--. 2012a. BLM New Mexico Sensitive Plants List. Revised January 2012.

--. 2012b. prairie_dog_colonies.shp (Shapefile of recorded prairie dog colonies within the general BLM-FFO region). Provided by BLM-FFO 2012.

--. 2012c. ffo_raptors_12122012.shp (Shapefile of recorded golden eagle, peregrine falcon, prairie falcon, and ferruginous hawk nests on BLM-FFO lands). Updated December 2012.

--. 2013a. aztec_gilia_habitat (Shapefile of the new Aztec gilia and Brack's fishhook cactus potential habitat "zone"). Provided by the BLM-FFO September 26, 2013.

--. 2013b. Brack's Cactus Transplant Procedure – 2013. Provided by BLM-FFO September 10, 2013.

--. 2014. Fragile Soils Procedure. Farmington, New Mexico: BLM-FFO.

Gruver, J.C. and D.A. Keinath. 2003. Species Assessment for Townsend's Big-Eared Bat (Corynorhinus [=Plecotus] Townsendii) in Wyoming. University of Wyoming.

Hazelton, A.F. (Navajo Nation Botanist). 2012. Species account for Sclerocactus mesae-verdae. Navajo Natural Heritage Program. Window Rock, Arizona.

Natural Resources Conservation Service (NRCS). 2009. Soil Survey of San Juan County, New Mexico: Eastern Part. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Natural Resources Conservation Service (NRCS). 2008. Soil Survey of Rio Arriba County Area, New Mexico: Parts of Rio Arriba and Sandoval Counties. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Natural Resources Conservation Service (NRCS). 2008. Soil Survey of Sandoval County Area, New Mexico: Parts of Los Alamos, Sandoval, and Rio Arriba Counties. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

--. 2010. Federal Noxious Weeds. http://plants.usda.gov/java/noxious?rptType=Federal. Accessed: May 2015.

NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life. Version 7.1. NatureServe, Arlington, VA. http://www.natureserve.org/explorer. Accessed: May 2015.

New Mexico Department of Agriculture. 2010. New Mexico Noxious Weed List. http://www.nmda.nmsu.edu/wp-content/uploads/2012/04/troublesome_weeds_nm.pdf. Accessed: May 2015.

New Mexico Department of Game and Fish. 2013. Biota Information System of New Mexico (BISON-M): Species Lists by County and Individual Species Accounts. http://www.bison-m.org/index.aspx. Accessed: May 2015.

New Mexico Partners in Flight (NMPIF). 2007. New Mexico Bird Conservation Plan Version 2.1. Compiled by C. Rustay and S. Norris. Albuquerque, New Mexico.

New Mexico Rare Plant Technical Council (NMRPTC). 2011. New Mexico Rare Plants. http://nmrareplants.unm.edu/rarelist.php. Accessed: May 2015.

Probst, D.L., A.L. Hobbes, and T.L. Stroh. 2001. Distribution and notes on Zuni bluehead sucker, *Castomus discobolus yarrowi*, in New Mexico. The Southwestern Naturalist 46: 158-170.

Sibley, David Allen. 2000. The National Audubon Society: The Sibley Guide to Birds. New York, New York: Alfred A. Knopf, Inc.

U.S. Fish and Wildlife Service (USFWS). 2014. IPaC – Information, Planning, and Conservation System. http://ecos.fws.gov/ipac/wizard/chooseLocation!prepare.action

U.S. Fish and Wildlife Service (USFWS). 2013. New Mexico Listed and Sensitive Species Lists. New Mexico Ecological Services Field Office. http://www.fws.gov/southwest/es/NewMexico/Sbc.cfm. Accessed: May 2015.

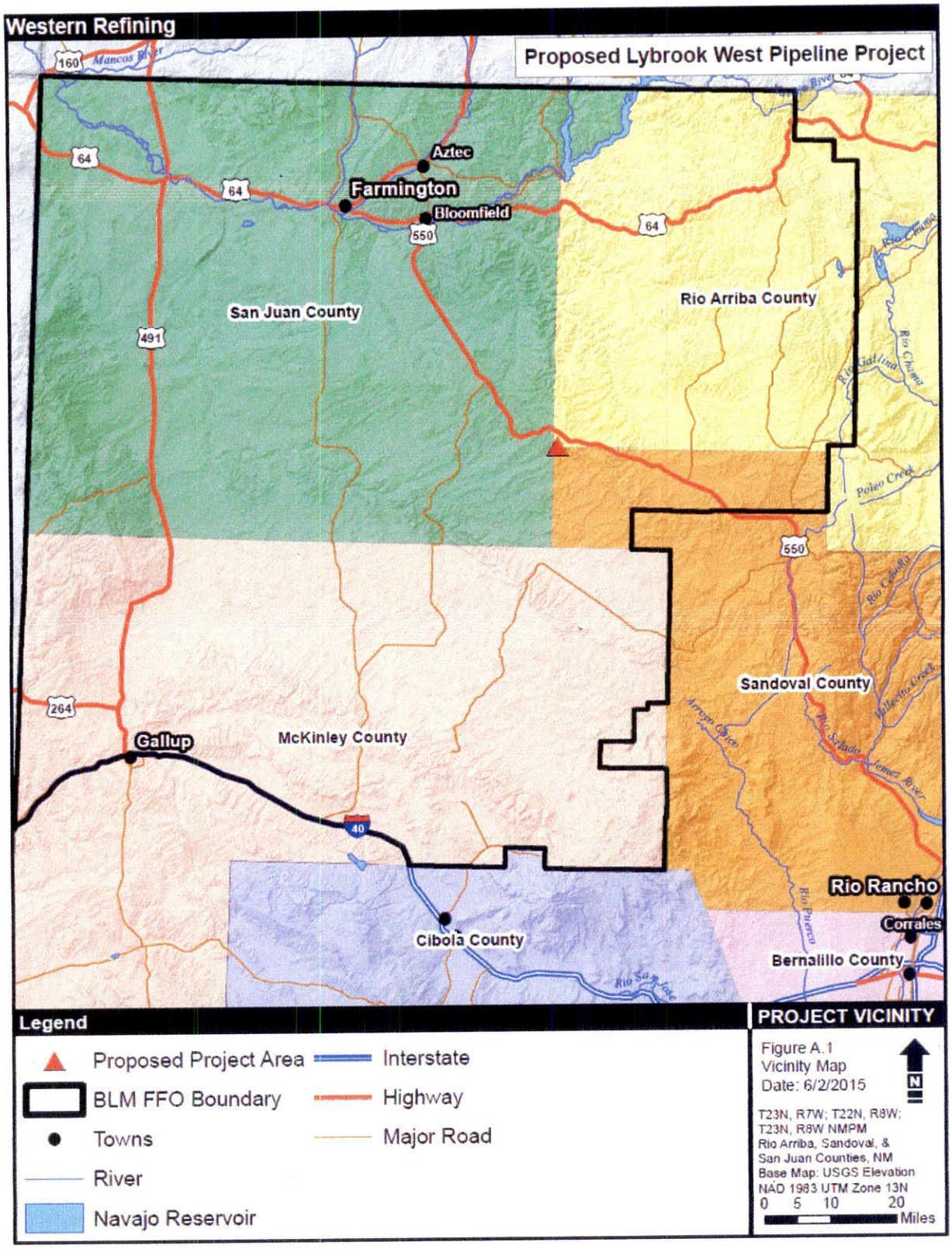
U.S. Geological Survey. 2005. nmgeol_dd_polygon (Shapefile of New Mexico Geology). http://mrdata.usgs.gov/geology/state/metadata/nm.html.

Wheeler, Brian K. 2003. Raptors of Western North America. Princeton, New Jersey: Princeton University Press.

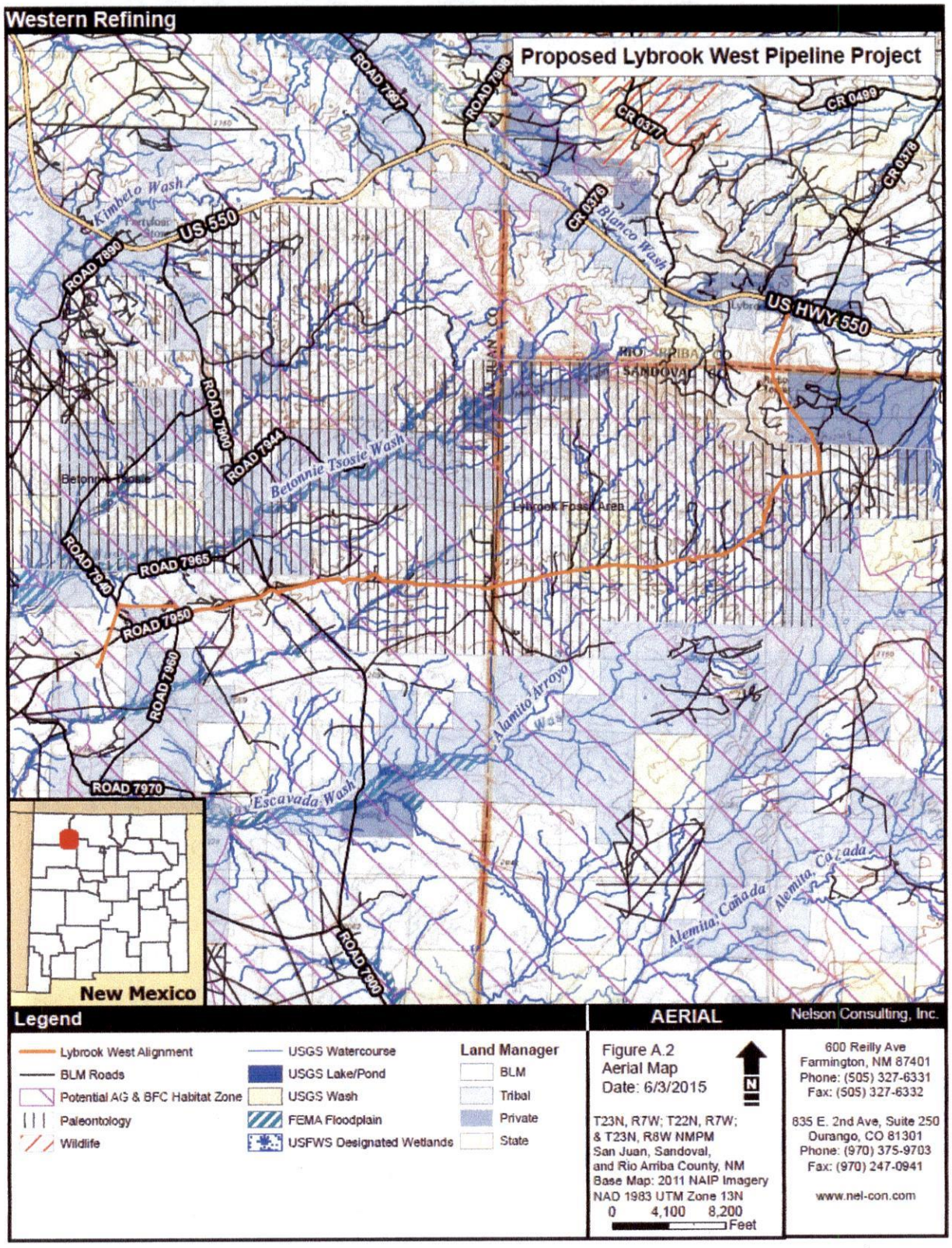
Whitson, Tom D., Larry C. Burrill, Steven A. Dewey, David W. Cudney, B.E. Nelson, Richard D. Lee, and Robert Parker. 1992. Weeds of the West, Revised. Edited by Tom D. Whitson. The Western Society of Weed Science in Cooperation with the Western United States Land Grant Universities Cooperative Extension Services.

APPENDIX A. MAPS

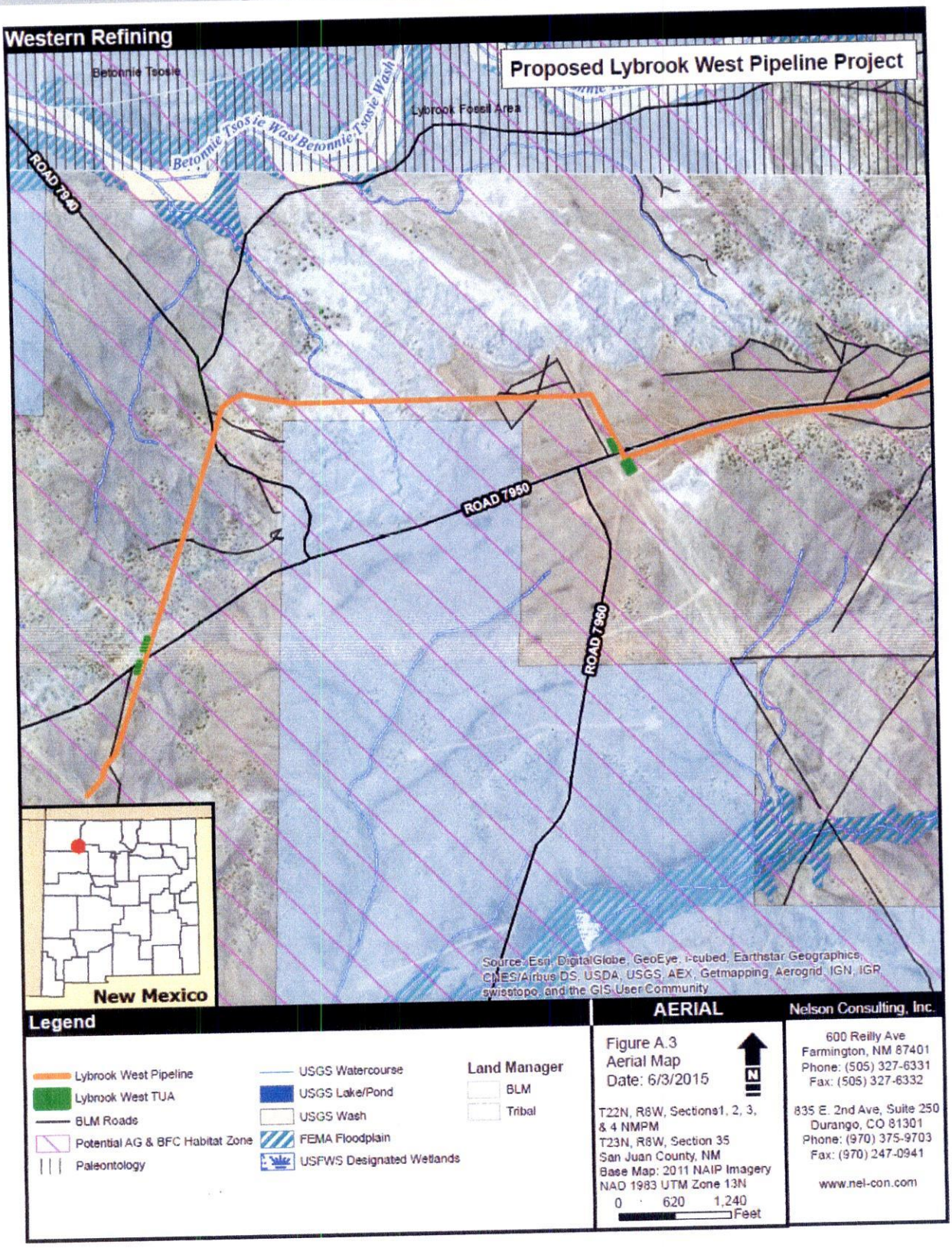
A.1. Vicinity Map

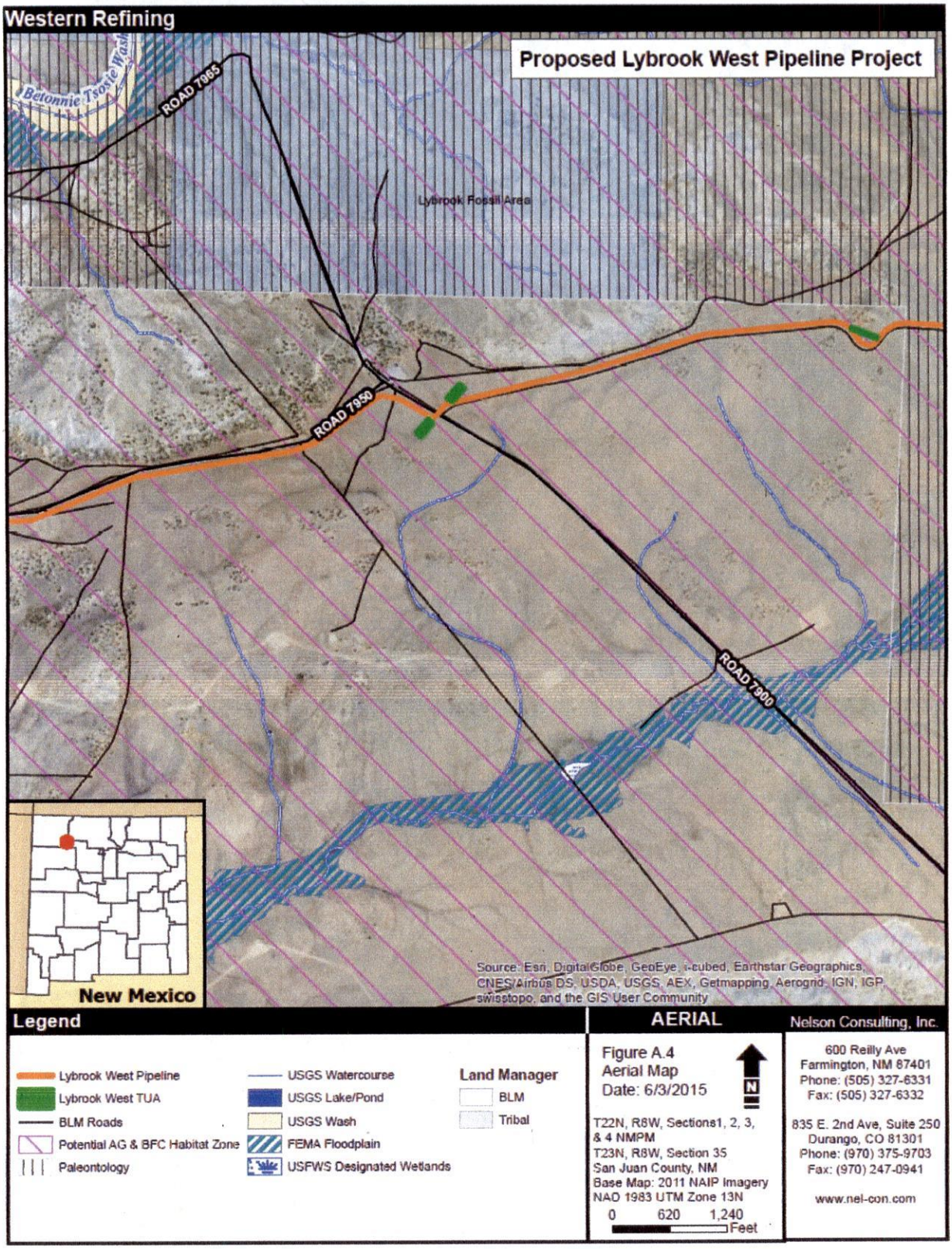


A.2. Project Area Map



A.3. Aerial Photograph




Western Refining
Proposed Lybrook West Pipeline Project
Betonnie Tsosie Wash
ROAD 7965
Lybrook Fossil Area
ROAD 7950
ROAD 7900
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
Lybrook West TUA
BLM Roads
Potential AG & BFC Habitat Zone
Paleontology
USGS Watercourse
USGS Lake/Pond
USGS Wash
FEMA Floodplain
USFWS Designated Wetlands
Land Manager
BLM
Tribal
AERIAL
Figure A.4
Aerial Map
Date: 6/3/2015
N
T22N, R8W, Sections1, 2, 3, & 4 NMPM
T23N, R8W, Section 35
San Juan County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
0 620 1,240
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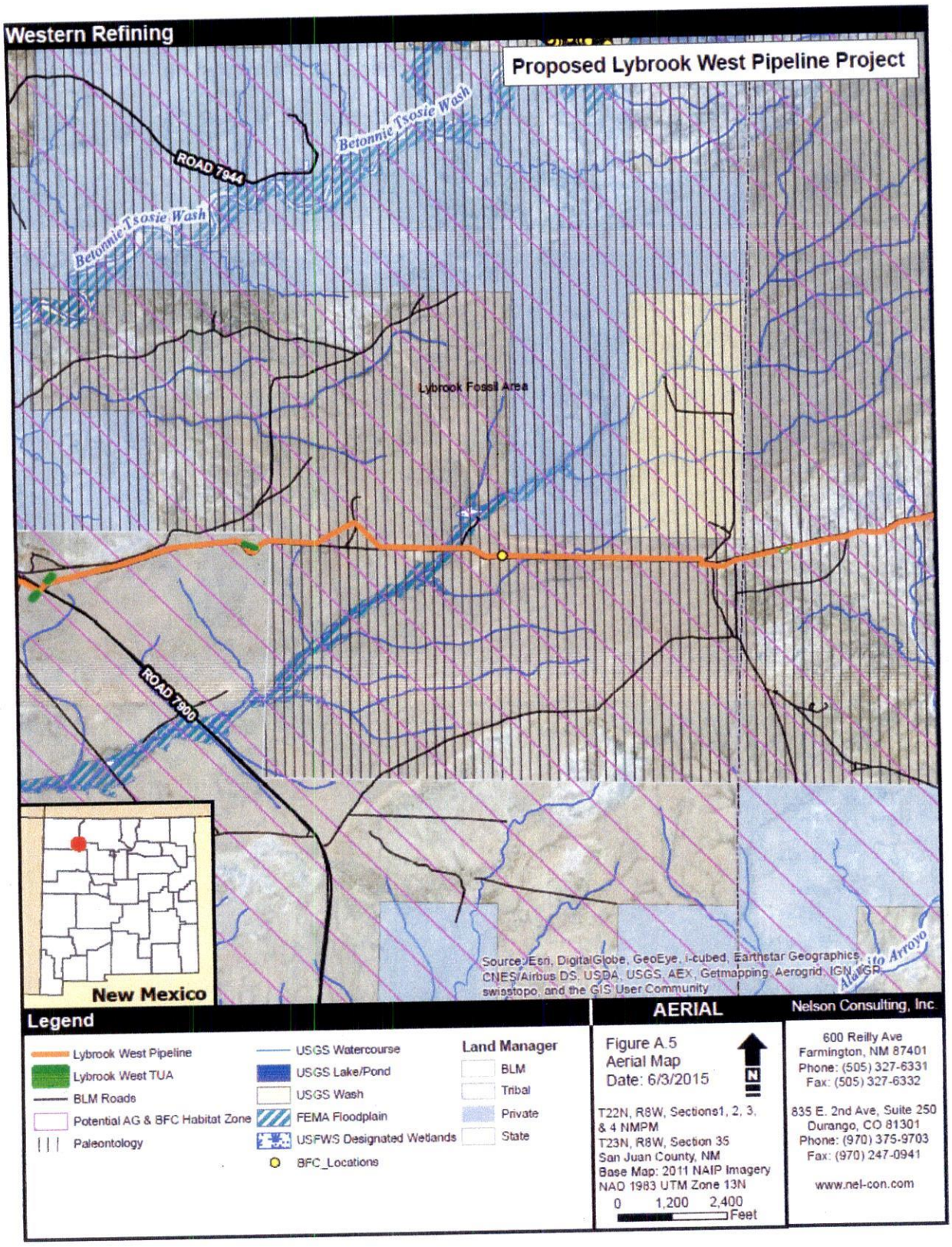
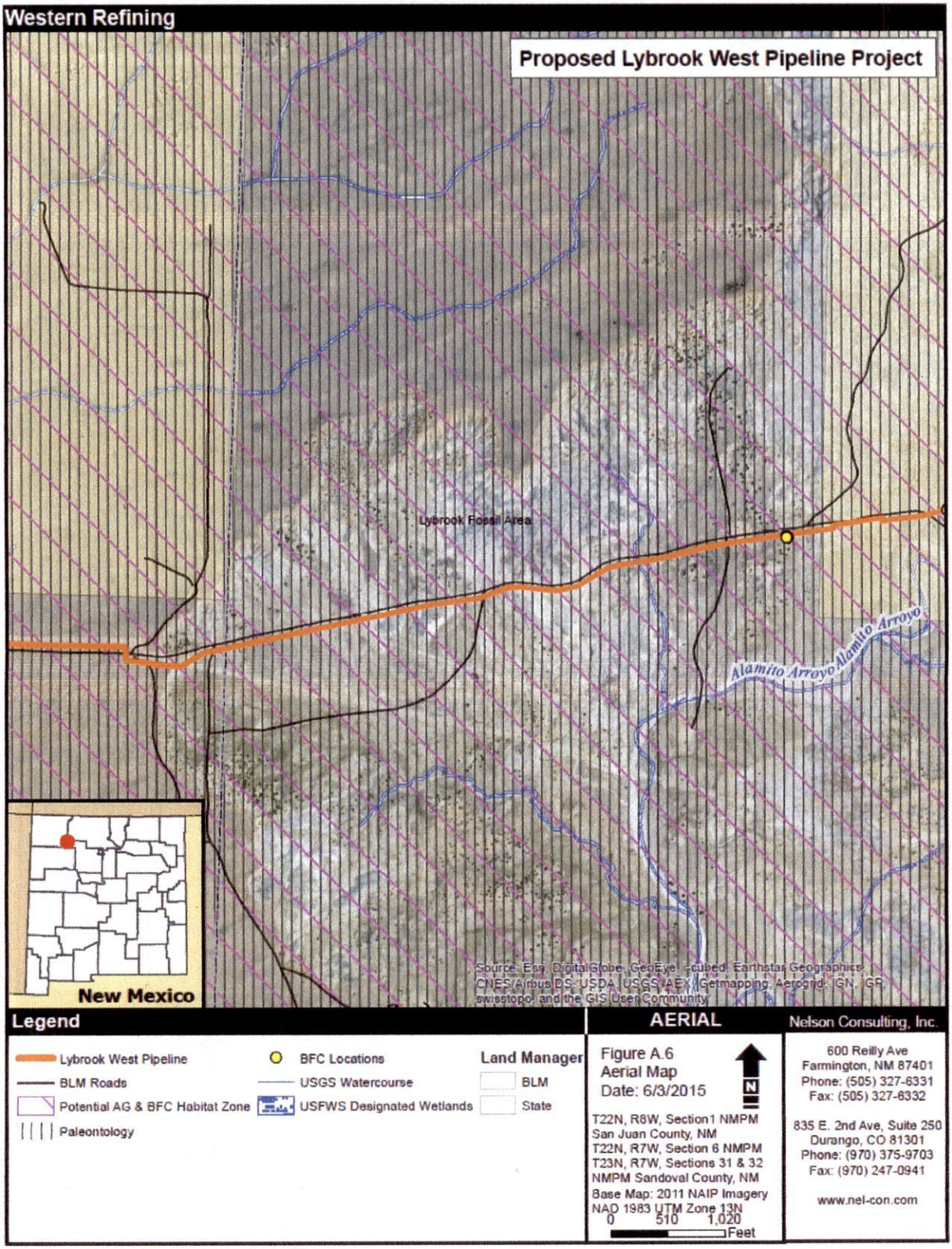

Western Refining
Proposed Lybrook West Pipeline Project
Betonnie Tsosie Wash
ROAD 7944
Betonnie Tsosie Wash
Lybrook Fossil Area
ROAD 7900
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
Lybrook West TUA
BLM Roads
Potential AG & BFC Habitat Zone
Paleontology
USGS Watercourse
USGS Lake/Pond
USGS Wash
FEMA Floodplain
USFWS Designated Wetlands
BFC_Locations
Land Manager
BLM
Tribal
Private
State
AERIAL
Figure A.5
Aerial Map
Date: 6/3/2015
T22N, R8W, Sections1, 2, 3, & 4 NMPM
T23N, R8W, Section 35
San Juan County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
0 1,200 2,400
Feet
Nelson Consulting, Inc.
600 Reilly Ave
Farmington, NM 87401
Phone: (505) 327-6331
Fax: (505) 327-6332
835 E. 2nd Ave, Suite 250
Durango, CO 81301
Phone: (970) 375-9703
Fax: (970) 247-0941
www.nel-con.com


Western Refining
Proposed Lybrook West Pipeline Project
Lybrook Fossil Area
Alamito Arroyo
Alamito Arroyo
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
BLM Roads
Potential AG & BFC Habitat Zone
Paleontology
BFC Locations
USGS Watercourse
USFWS Designated Wetlands
Land Manager
BLM
State
AERIAL
Nelson Consulting, Inc.
Figure A.6
Aerial Map
Date: 6/3/2015
N
T22N, R8W, Section1 NMPM
San Juan County, NM
T22N, R7W, Section 6 NMPM
T23N, R7W, Sections 31 & 32
NMPM Sandoval County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
0 510 1,020
Feet
600 Reilly Ave
Farmington, NM 87401
Phone: (505) 327-6331
Fax: (505) 327-6332
835 E. 2nd Ave, Suite 250
Durango, CO 81301
Phone: (970) 375-9703
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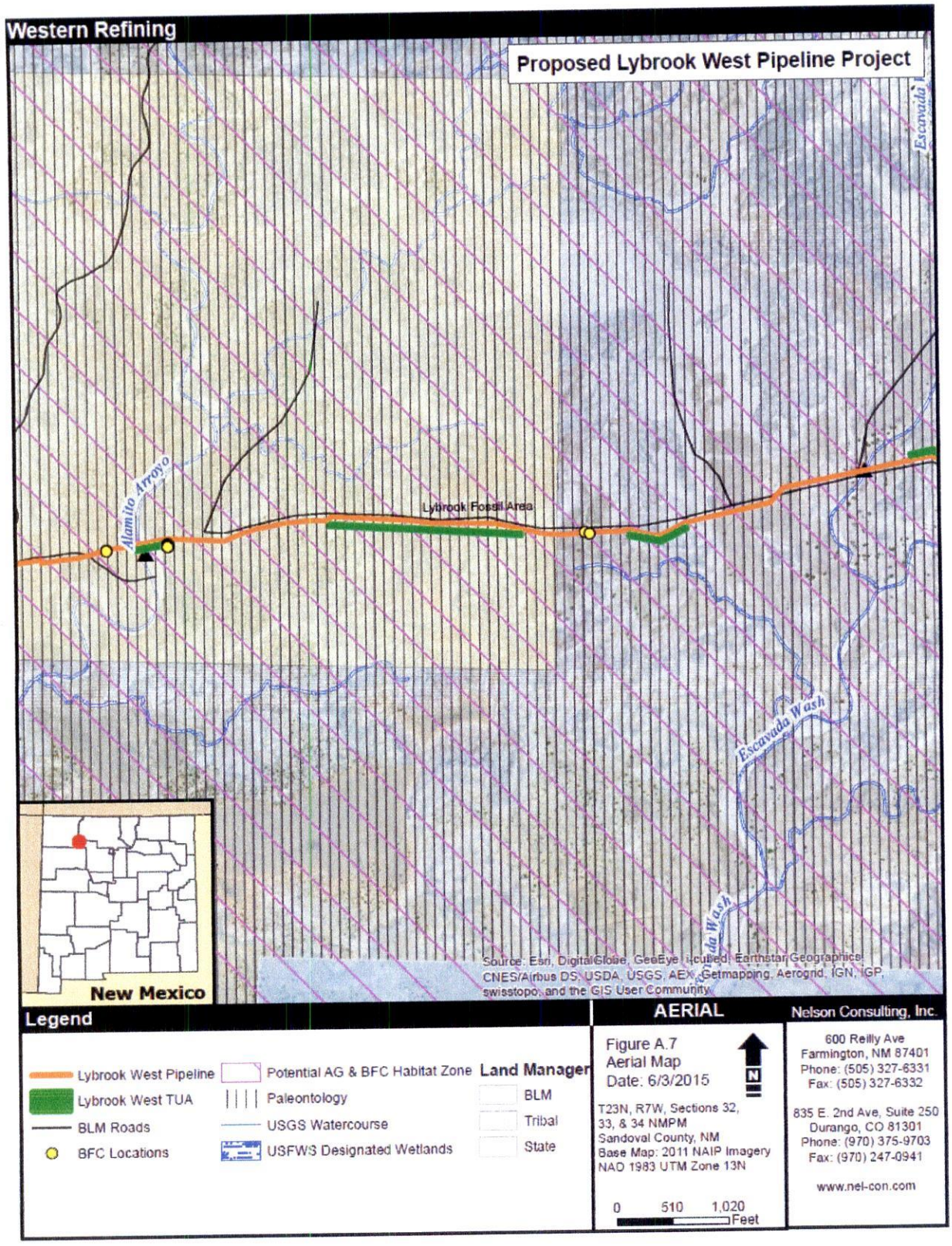
Western Refining
Proposed Lybrook West Pipeline Project
Escavada
Alamito Arroyo
Lybrook Fossil Area
Escavada Wash
Escavada Wash
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
Lybrook West TUA
BLM Roads
BFC Locations
Potential AG & BFC Habitat Zone
Paleontology
USGS Watercourse
USFWS Designated Wetlands
Land Manager
BLM
Tribal
State
AERIAL
Figure A.7
Aerial Map
Date: 6/3/2015
T23N, R7W, Sections 32, 33, & 34 NMPM
Sandoval County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
N
0 510 1,020
Feet
Nelson Consulting, Inc.
600 Reilly Ave
Farmington, NM 87401
Phone: (505) 327-6331
Fax: (505) 327-6332
835 E. 2nd Ave, Suite 250
Durango, CO 81301
Phone: (970) 375-9703
Fax: (970) 247-0941
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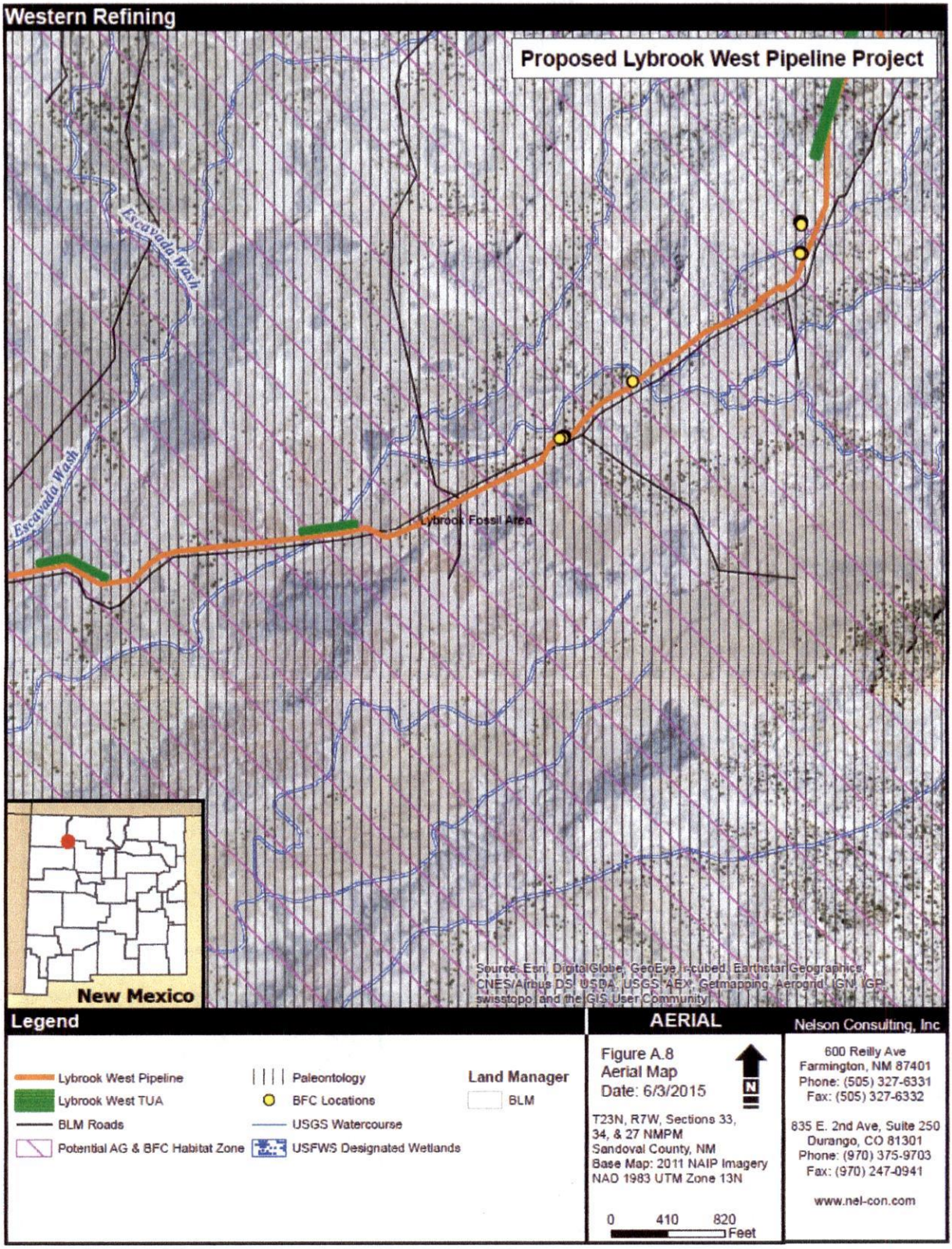
Western Refining
Proposed Lybrook West Pipeline Project
Escavada Wash
Escavada Wash
Lybrook Fossil Area
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
Lybrook West TUA
BLM Roads
Potential AG & BFC Habitat Zone
Paleontology
BFC Locations
USGS Watercourse
USFWS Designated Wetlands
Land Manager
BLM
AERIAL
Figure A.8
Aerial Map
Date: 6/3/2015
T23N, R7W, Sections 33, 34, & 27 NMPM
Sandoval County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
N
0
410
820
Feet
Nelson Consulting, Inc
600 Reilly Ave
Farmington, NM 87401
Phone: (505) 327-6331
Fax: (505) 327-6332
835 E. 2nd Ave, Suite 250
Durango, CO 81301
Phone: (970) 375-9703
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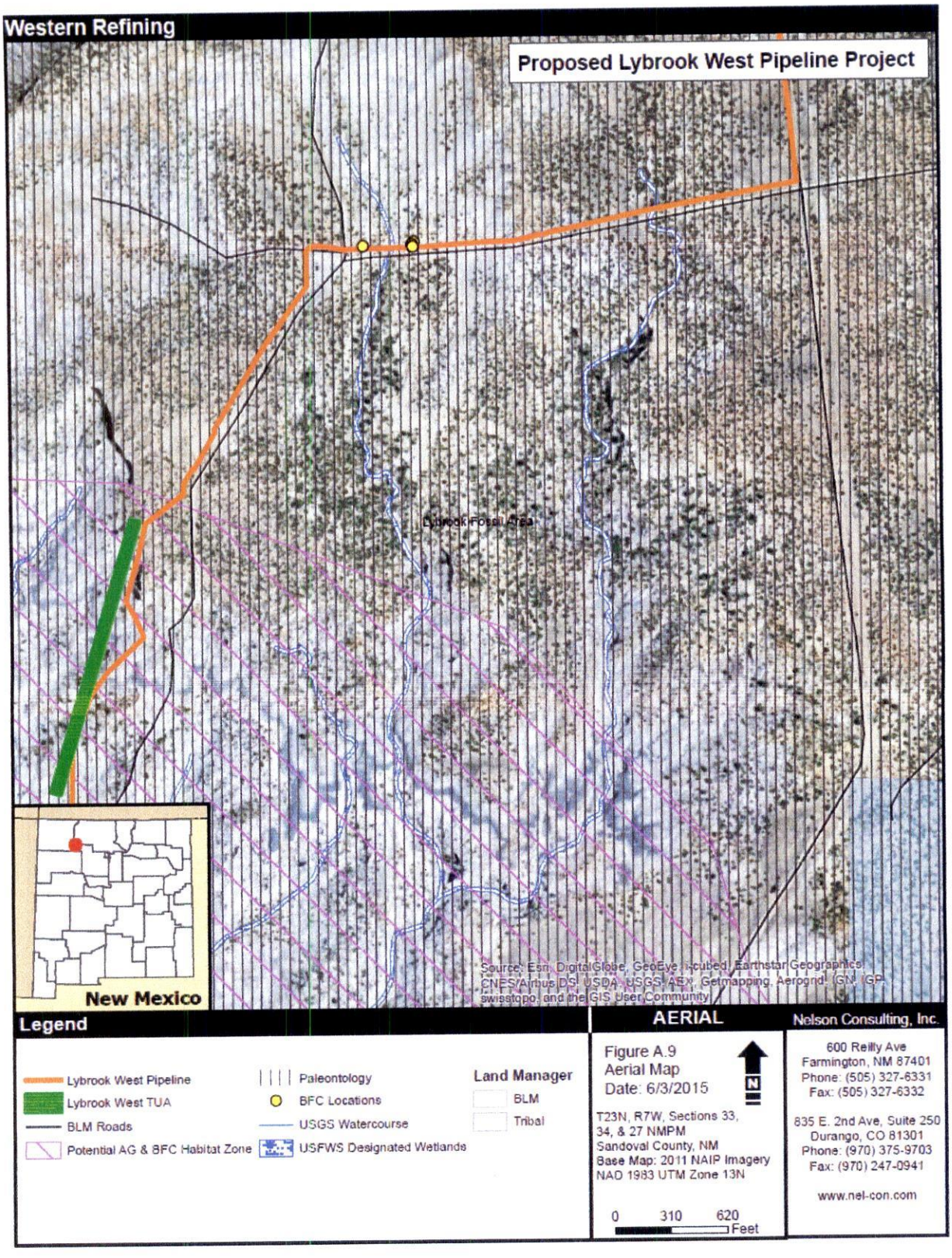
Western Refining
Proposed Lybrook West Pipeline Project
Lybrook Fossil Area
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
Lybrook West TUA
BLM Roads
Potential AG & BFC Habitat Zone
Paleontology
BFC Locations
USGS Watercourse
USFWS Designated Wetlands
Land Manager
BLM
Tribal
AERIAL
Figure A.9
Aerial Map
Date: 6/3/2015
T23N, R7W, Sections 33, 34, & 27 NMPM
Sandoval County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
0 310 620
Feet
Nelson Consulting, Inc.
600 Reilly Ave
Farmington, NM 87401
Phone: (505) 327-6331
Fax: (505) 327-6332
835 E. 2nd Ave, Suite 250
Durango, CO 81301
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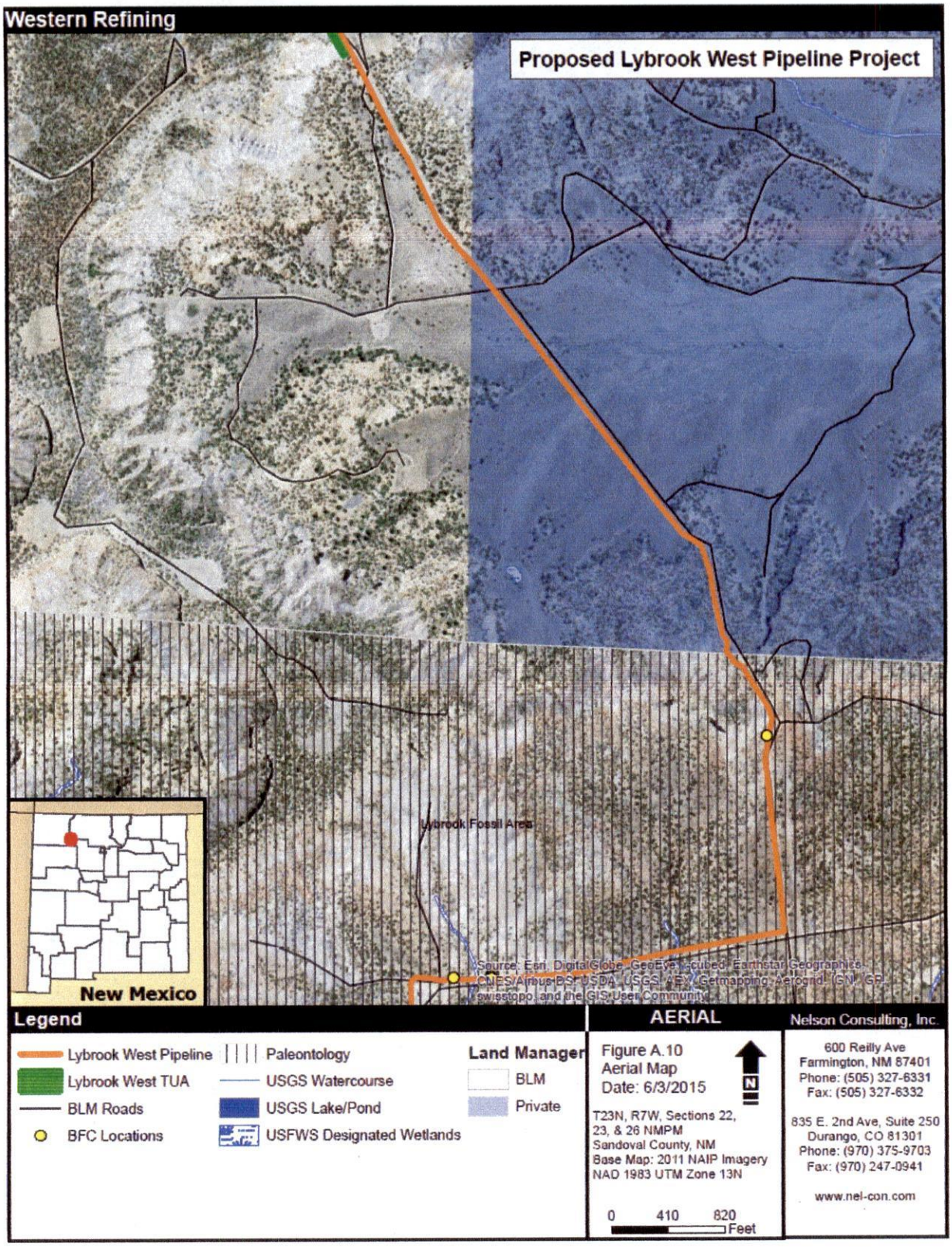
Western Refining
Proposed Lybrook West Pipeline Project
Lybrook Fossil Area
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
Lybrook West TUA
BLM Roads
BFC Locations
Paleontology
USGS Watercourse
USGS Lake/Pond
USFWS Designated Wetlands
Land Manager
BLM
Private
AERIAL
Figure A.10
Aerial Map
Date: 6/3/2015
T23N, R7W, Sections 22, 23, & 26 NMPM
Sandoval County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
N
0 410 820
Feet
Nelson Consulting, Inc.
600 Reilly Ave
Farmington, NM 87401
Phone: (505) 327-6331
Fax: (505) 327-6332
835 E. 2nd Ave, Suite 250
Durango, CO 81301
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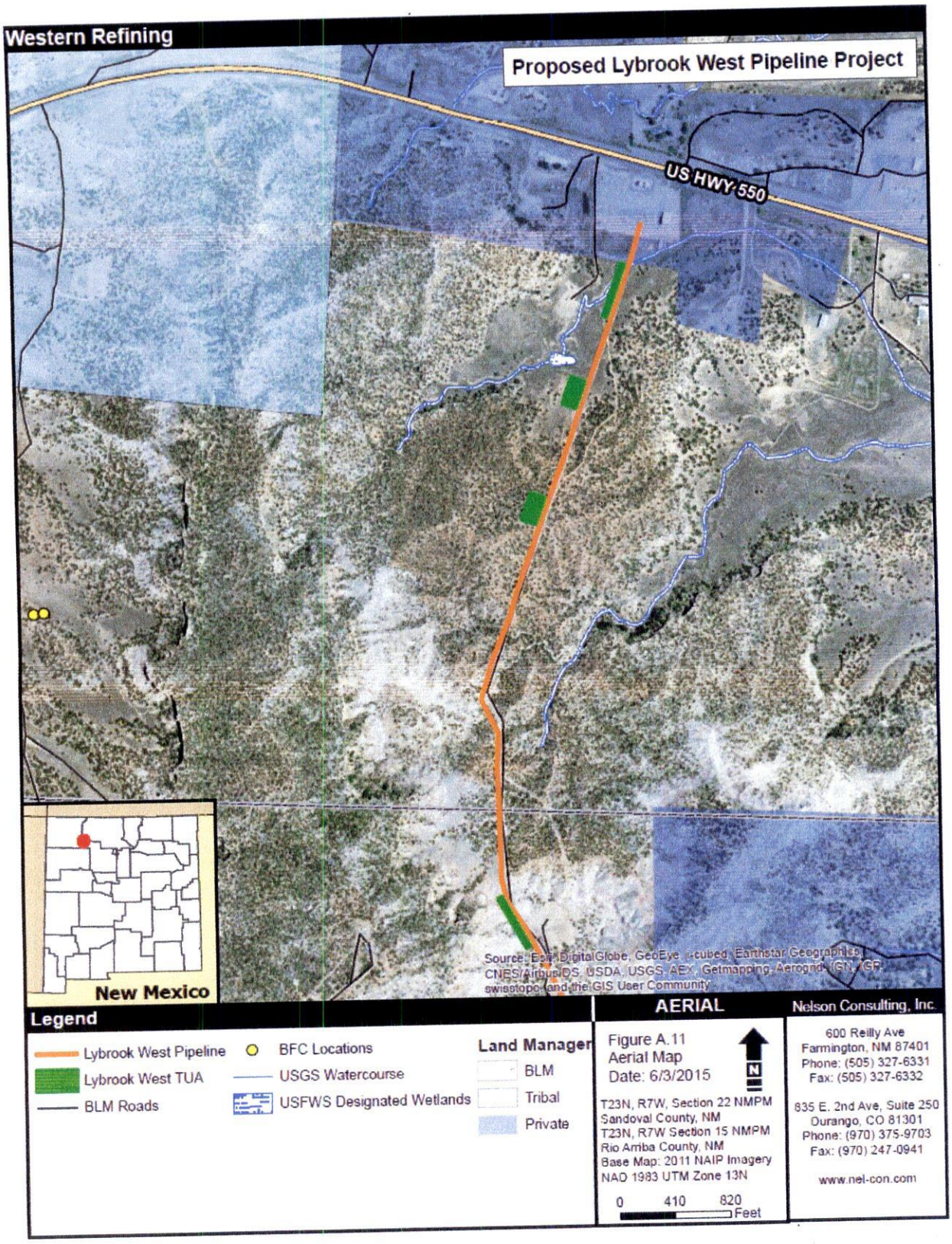
Western Refining
Proposed Lybrook West Pipeline Project
US HWY 550
New Mexico
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Legend
Lybrook West Pipeline
Lybrook West TUA
BLM Roads
BFC Locations
USGS Watercourse
USFWS Designated Wetlands
Land Manager
BLM
Tribal
Private
AERIAL
Nelson Consulting, Inc.
Figure A.11
Aerial Map
Date: 6/3/2015
N
T23N, R7W, Section 22 NMPM
Sandoval County, NM
T23N, R7W Section 15 NMPM
Rio Arriba County, NM
Base Map: 2011 NAIP Imagery
NAD 1983 UTM Zone 13N
0 410 820
Feet
600 Reilly Ave
Farmington, NM 87401
Phone: (505) 327-6331
Fax: (505) 327-6332
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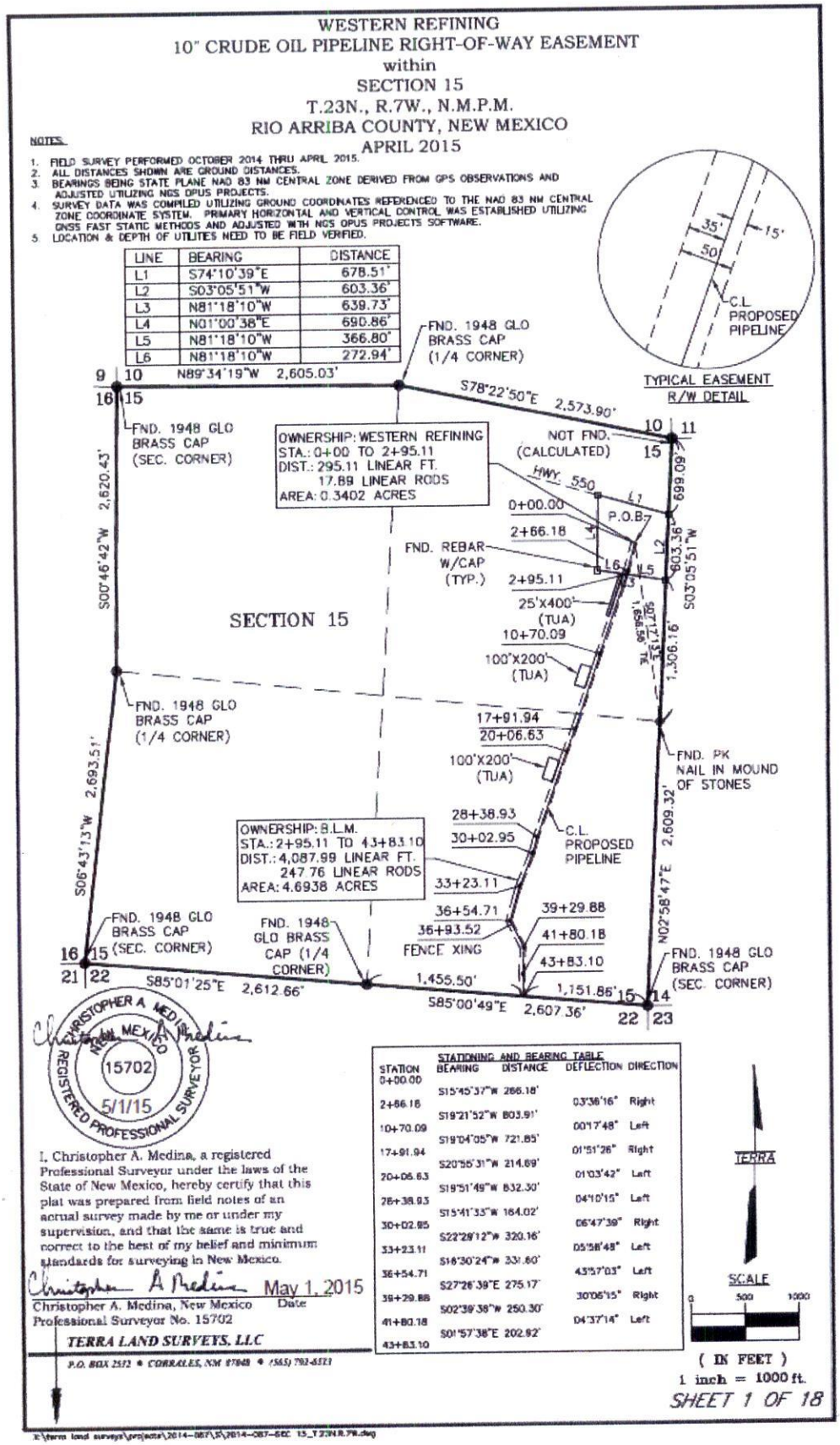

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 15
T.23N., R.7W., N.M.P.M.
RIO ARRIBA COUNTY, NEW MEXICO
APRIL 2015
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
LINE BEARING DISTANCE
L1 S74°10'39"E 678.51'
L2 S03°05'51"W 603.36'
L3 N81°18'10"W 639.73'
L4 N01°00'38"E 690.86'
L5 N81°18'10"W 366.80'
L6 N81°18'10"W 272.94'
35'
15'
50'
C.L. PROPOSED PIPELINE
TYPICAL EASEMENT R/W DETAIL
FND. 1948 GLO BRASS CAP (1/4 CORNER)
N89°34'19"W 2,605.03'
S78°22'50"E 2,573.90'
FND. 1948 GLO BRASS CAP (SEC. CORNER)
OWNERSHIP: WESTERN REFINING
STA.: 0+00 TO 2+95.11
DIST.: 295.11 LINEAR FT.
17.89 LINEAR RODS
AREA: 0.3402 ACRES
NOT FND. (CALCULATED)
HWY. 550
0+00.00
P.O.B.
2+66.18
FND. REBAR W/CAP (TYP.)
2+95.11
25'X400' (TUA)
10+70.09
100'X200' (TUA)
SECTION 15
S00°46'42"W 2,620.43'
S03°05'51"W 699.09'
S03°05'51"W 603.36'
N81°18'10"W 1,306.16'
FND. 1948 GLO BRASS CAP (1/4 CORNER)
17+91.94
20+06.63
100'X200' (TUA)
FND. PK NAIL IN MOUND OF STONES
S06°43'13"W 2,693.51'
N02°58'47"E 2,609.32'
OWNERSHIP: B.L.M.
STA.: 2+95.11 TO 43+83.10
DIST.: 4,087.99 LINEAR FT.
247.76 LINEAR RODS
AREA: 4.6938 ACRES
28+38.93
30+02.95
C.L. PROPOSED PIPELINE
33+23.11
36+54.71
36+93.52
FENCE XING
39+29.88
41+80.18
43+83.10
FND. 1948 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
S85°01'25"E 2,612.66'
1,455.50'
S85°00'49"E 2,607.36'
1,151.86'
STATIONING AND BEARING TABLE
STATION BEARING DISTANCE DEFLECTION DIRECTION
0+00.00
S15°45'37"W 266.18'
2+66.18 03°36'16" Right
S19°21'52"W 803.91'
10+70.09 00°17'48" Left
S19°04'05"W 721.85'
17+91.94 01°51'26" Right
S20°56'31"W 214.69'
20+06.63 01°03'42" Left
S19°51'49"W 832.30'
28+38.93 04°10'15" Left
S15°41'33"W 164.02'
30+02.95 06°47'39" Right
S22°28'12"W 320.16'
33+23.11 05°58'48" Left
S16°30'24"W 331.60'
36+54.71 4°57'03" Left
S27°26'39"E 275.17'
39+29.88 30°06'15" Right
S02°39'38"W 250.30'
41+80.18 04°37'14" Left
S01°57'38"E 202.92'
43+83.10
CHRISTOPHER A. MEDINA NEW MEXICO 15702 REGISTERED PROFESSIONAL SURVEYOR 5/1/15
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
P.O. BOX 2512 • CORRALES, NM 87048 • (505) 792-6523
TERRA
SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.
SHEET 1 OF 18

APPENDIX B. PLATS

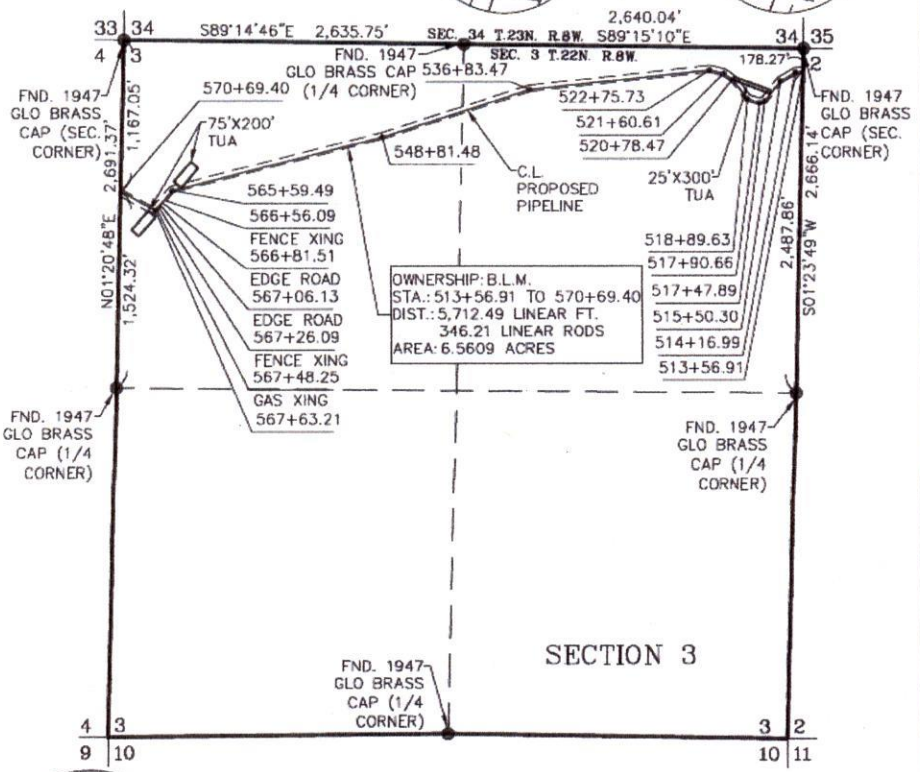
WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 3
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015

NOTES:

1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.

TYPICAL EASEMENT R/W DETAIL
STA. 567+63.21 TO 570+69.40

TYPICAL EASEMENT R/W DETAIL
STA. 513+56.91 TO 567+63.21



CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR

I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.

Christopher A Medina MAY 1, 2015

Christopher A. Medina, New Mexico Professional Surveyor No. 15702 — Date

TERRA LAND SURVEYS, LLC

P.O. BOX 2532 • CORRALES, NM 87048 • (505) 792-8573

STATIONING AND BEARING TABLE

STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
513+56.91				
	S83°34'40"E	60.08'		
514+16.99			24°02'00"	Left
	S59°32'40"W	133.31'		
515+50.30			20°57'17"	Left
	S38°35'23"W	197.59'		
517+47.89			34°09'31"	Right
	S72°44'55"W	42.77'		
517+90.66			34°10'14"	Right
	N73°04'51"W	98.97'		
518+89.63			35°02'24"	Right
	N38°02'27"W	188.84'		
520+78.47			15°43'14"	Left
	N53°45'41"W	82.14'		
521+60.61			22°56'56"	Left
	N76°42'37"W	115.12'		
522+75.73			19°27'48"	Left
	S83°49'36"W	1407.74'		
536+83.47			11°34'40"	Left
	S72°14'55"W	1198.01'		
548+81.48			03°38'29"	Right
	S75°53'25"W	1678.01'		
565+59.49			34°34'41"	Left
	S41°18'43"W	203.72'		
567+63.21			77°38'03"	Right
	N61°03'14"W	305.16'		
570+69.40				

TERRA

SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.

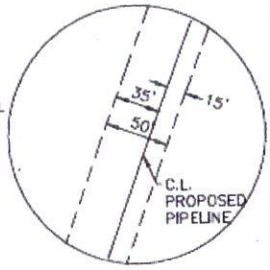
SHEET 14 OF 18

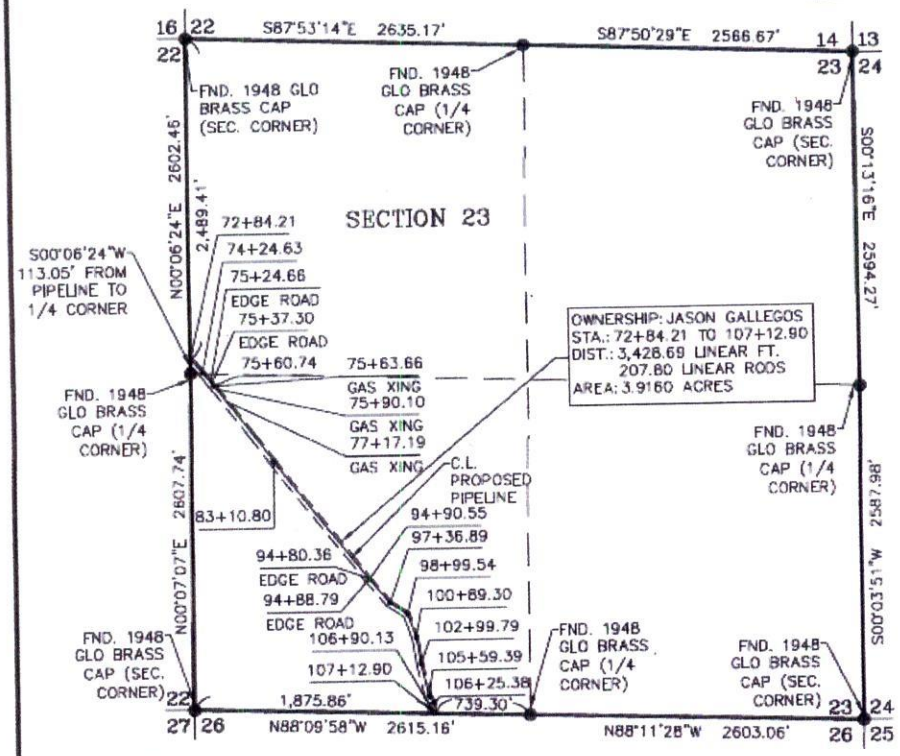
X:\terra land surveys\projects\2014-087\S\2014-087-SEC 3_T.22N.R.8W.dwg

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 23
T.23N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015

NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.

TYPICAL EASEMENT R/W DETAIL





STATIONING AND BEARING TABLE

STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
72+84.21				
	S42°16'19"E	140.42'		
74+24.63			03°41'56"	Right
	S38°34'23"E	136.11'		
75+60.74			00°50'35"	Right
	S37°43'48"E	750.06'		
83+10.80			00°45'33"	Left
	S38°27'21"E	1179.75'		
94+90.55			02°04'55"	Left
	S40°32'15"E	246.34'		
97+36.89			16°00'25"	Left
	S56°32'40"E	162.65'		
98+99.54			36°47'49"	Right
	S19°44'51"E	189.75'		
100+89.30			09°53'07"	Right
	S09°51'44"E	210.49'		
102+99.79			03°01'34"	Left
	S12°53'17"E	259.60'		
105+59.39			20°31'41"	Left
	S33°24'58"E	65.99'		
106+25.38			39°28'55"	Right
	S06°03'57"W	84.75'		
106+90.13			43°41'24"	Left
	S37°37'28"E	22.77'		
107+12.90				

CHRISTOPHER A. MEDINA NEW MEXICO 15702 5/1/15 REGISTERED PROFESSIONAL SURVEYOR

I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.

Christopher A Medina MAY 1, 2015
Christopher A. Medina, New Mexico Date
Profesasional Surveyor No. 15702

TERRA LAND SURVEYS, LLC
P.O. BOX 2432 • CORRALES, NM 87048 • (505) 792-8833

TERRA

SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.

SHEET 3 OF 18

x:\terra land surveys\projects\2014-087\5\2014-087-SEC 23_T23N R7W.dwg

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 31
T.23N., R.7W., N.M.P.M.
RIO ARRIBA COUNTY, NEW MEXICO
APRIL 2015

NOTES:

1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
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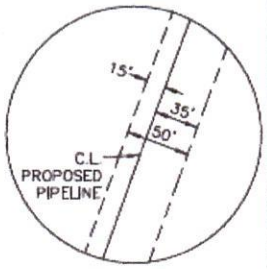
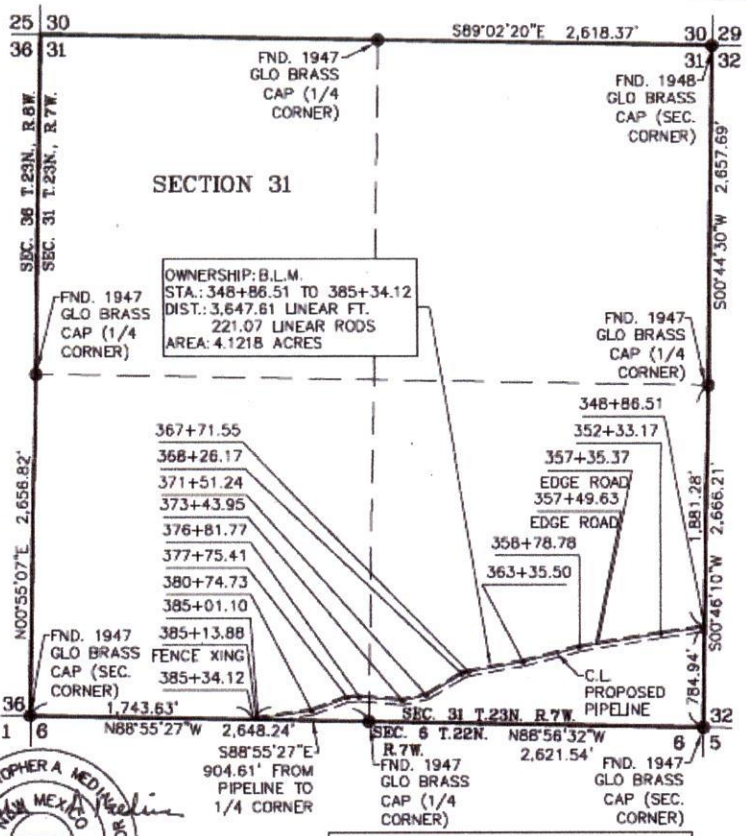
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.

TYPICAL EASEMENT R/W DETAIL





CHRISTOPHER A. MEDINA NEW MEXICO 15702 REGISTERED PROFESSIONAL SURVEYOR 5/1/15

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Christopher A Medina MAY 1, 2015

Christopher A. Medina, New Mexico Professional Surveyor No. 15702 — Date

TERRA LAND SURVEYS, LLC

P.O. BOX 2533 • CORRALES, NM 87048 • (505) 792-0533

STATIONING AND BEARING TABLE

STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
348+86.51				
	S81°45'09"W	346.66'		
352+33.17			01°08'45"	Left
	S80°36'24"W	645.61'		
358+78.78			05°04'56"	Left
	S75°31'28"W	456.72'		
363+35.50			04°12'00"	Right
	S79°43'28"W	436.05'		
367+71.55			06°55'45"	Left
	S72°47'43"W	54.62'		
368+26.17			13°48'24"	Left
	S58°58'20"W	325.07'		
371+51.24			16°33'11"	Right
	S77°32'31"W	192.71'		
373+43.95			17°19'37"	Right
	N85°07'52"W	337.82'		
376+81.77			08°03'56"	Left
	S86°48'12"W	93.64'		
377+75.41			16°33'05"	Left
	S70°15'07"W	298.32'		
380+74.73			11°20'00"	Right
	S81°35'08"W	426.37'		
385+01.10			04°06'09"	Left
	S77°28'59"W	33.02'		
385+34.12				

TERRA

SCALE

0 500 1000

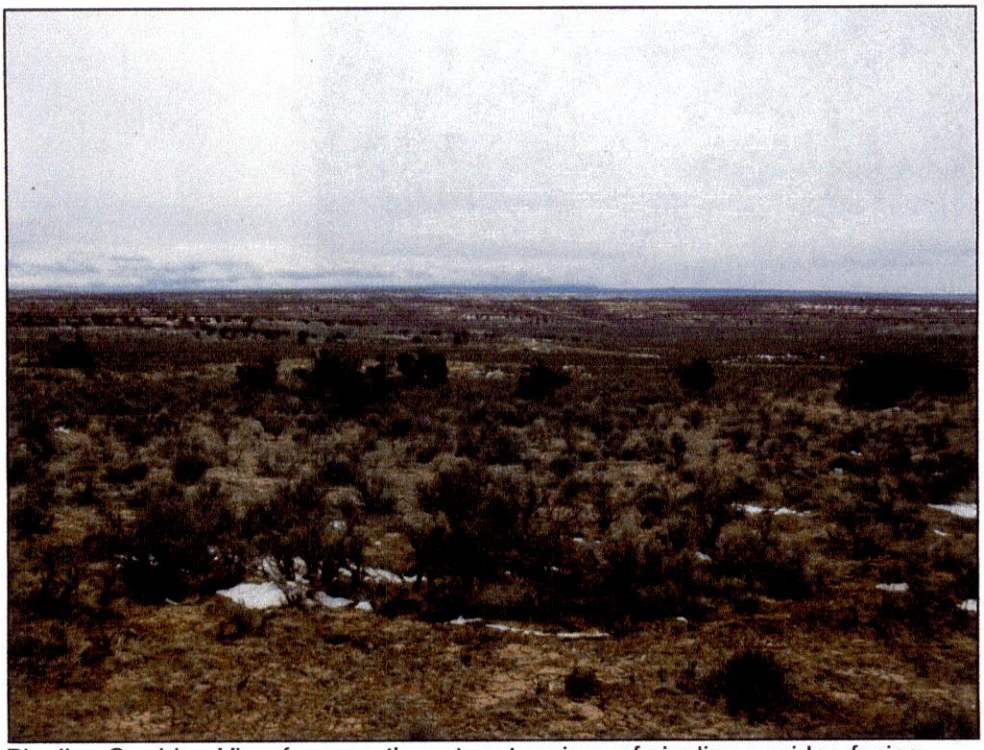
(IN FEET)

1 inch = 1000 ft.

SHEET 9 OF 18

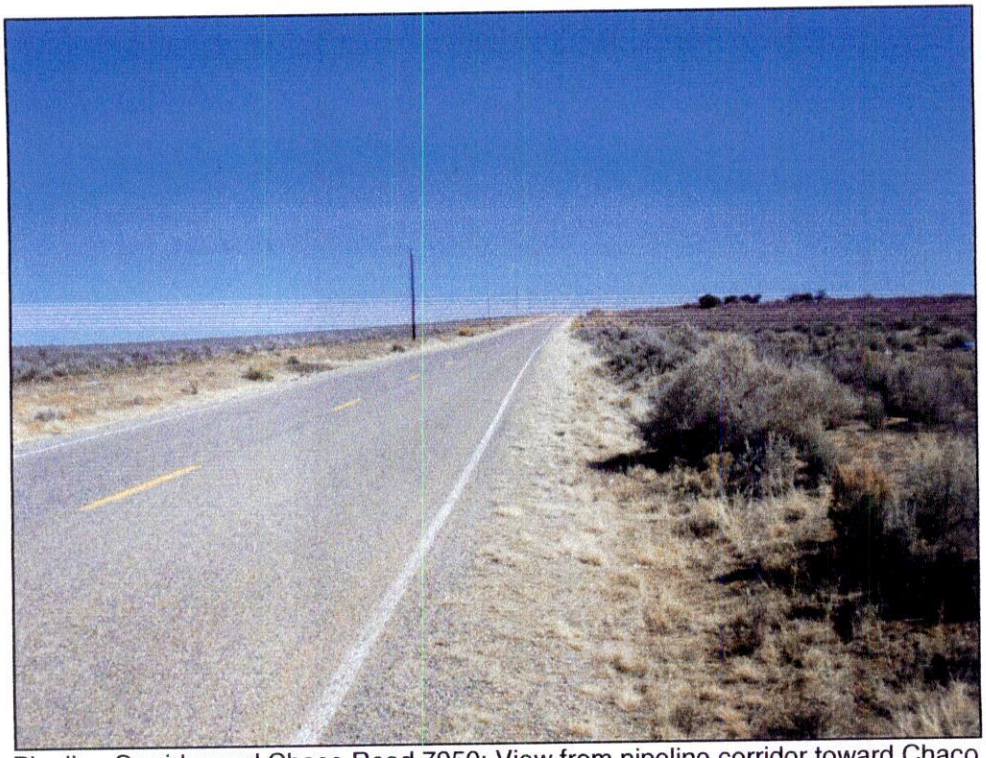
X:\terra land surveys\projects\3814-087\5\2014-087-SEC 31_T23N R7W.dwg

APPENDIX C. PHOTOGRAPHS



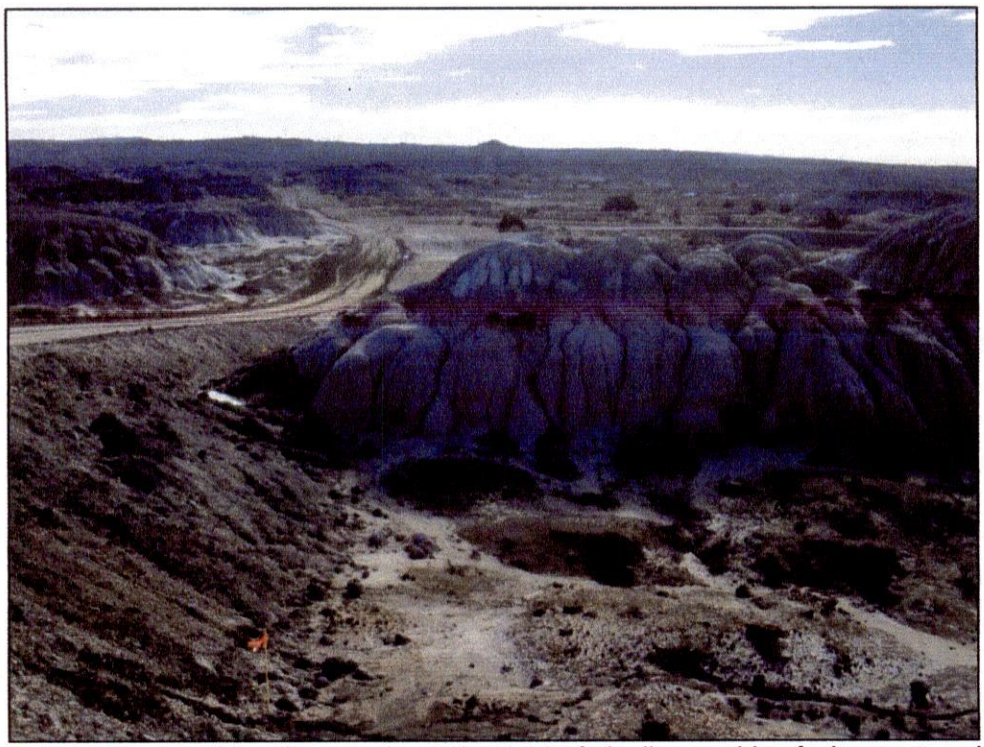
Pipeline Corridor: View from southwestern terminus of pipeline corridor, facing Southward

Pipeline Corridor: View from southwestern terminus of pipeline corridor, facing northward



Pipeline Corridor and Chaco Road 7950: View from pipeline corridor toward Chaco Road 7950, facing northward

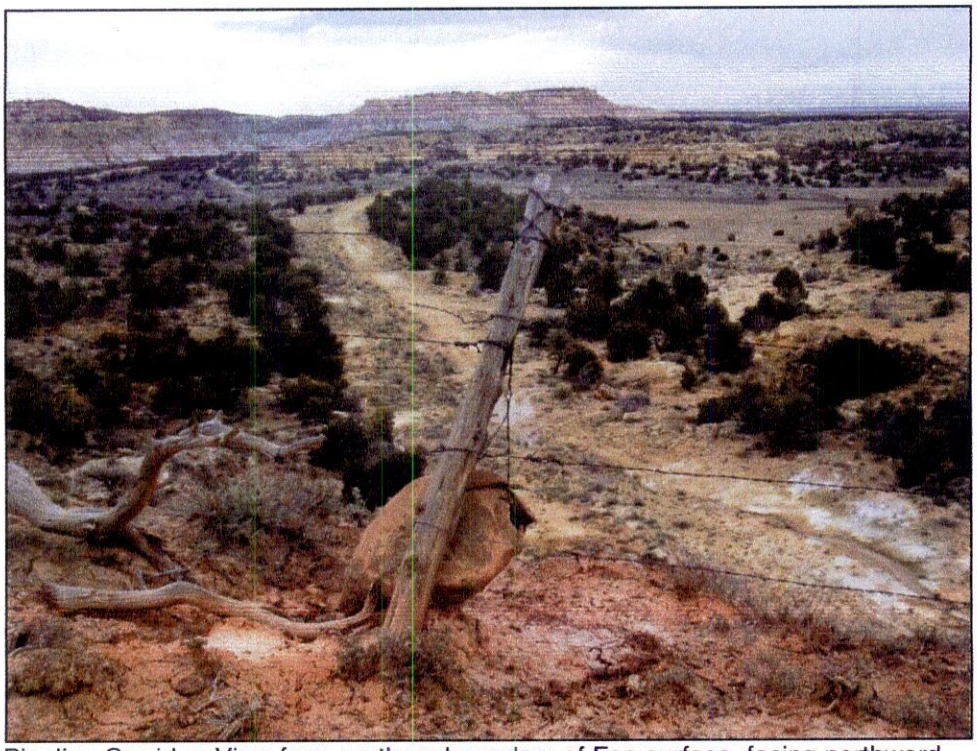
Pipeline Corridor: View from station 2355+61 of pipeline corridor, facing eastward



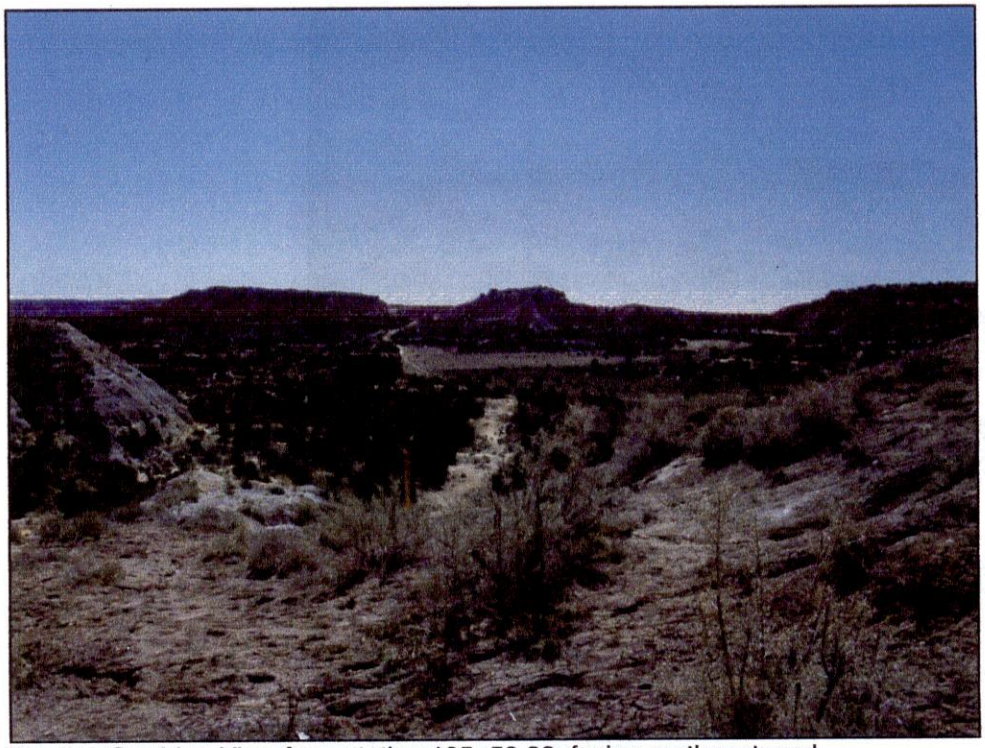
Pipeline Corridor: View from station 343+12.89 of pipeline corridor, facing eastward

Existing Road: View of piñon-juniper habitat and ponderosa pine (*Pinus ponderosa*) trees avoided by the pipeline corridor, facing northwestward

Pipeline Corridor: View from station 193+26.47, facing northward

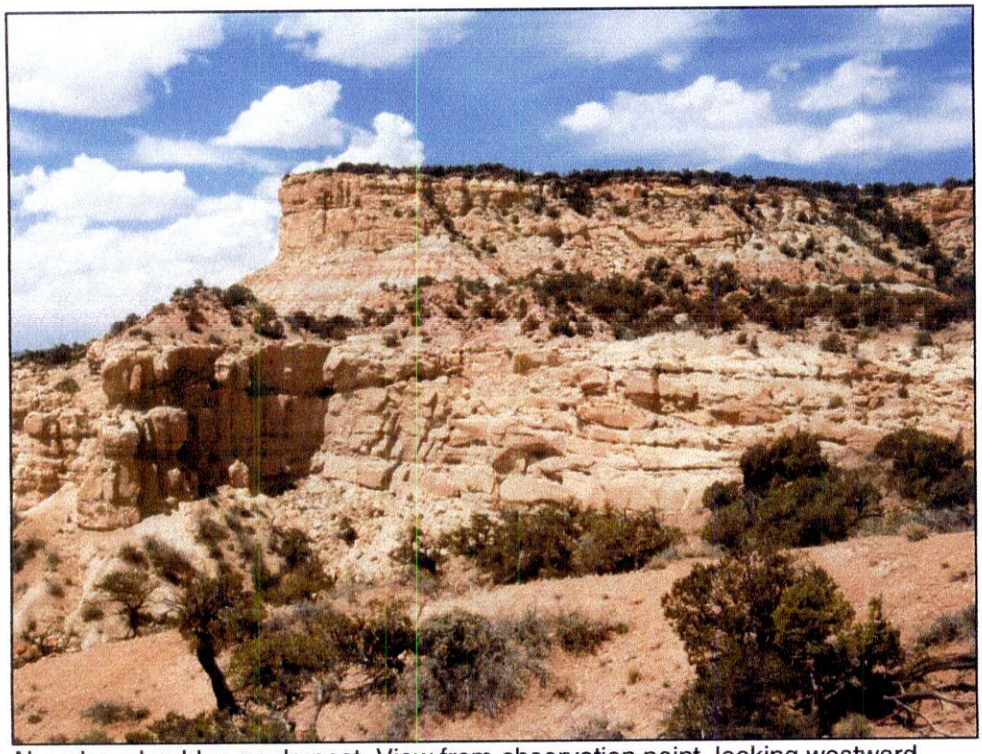


Pipeline Corridor: View from northern boundary of Fee surface, facing northward

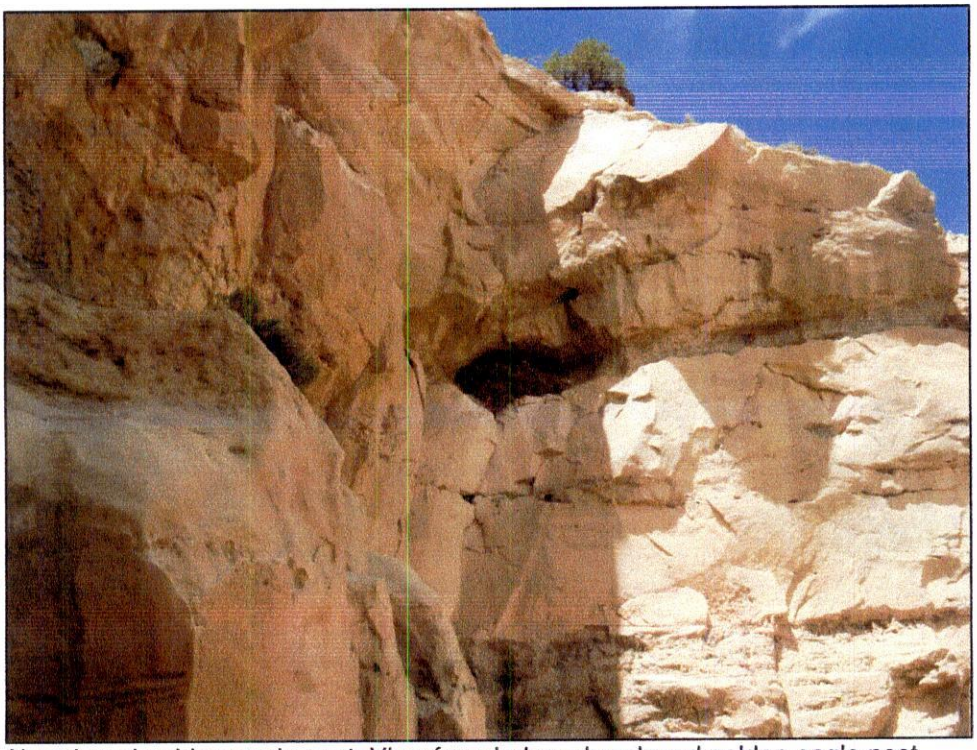


Pipeline Corridor: View from station 105+59.39, facing northeastward

Pipeline Corridor: View from station 17+91.94, toward Western's Lybrook Storage Battery Station, facing northeastward



Abandoned golden eagle nest: View from observation point, looking westward.



Abandoned golden eagle nest: View from below abandoned golden eagle nest, looking northwestward.

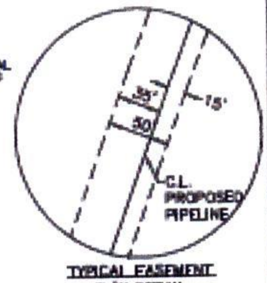
APPENDIX C. PLATS

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 15
T.23N., R.7W., N.M.P.M.
RIO ARRIBA COUNTY, NEW MEXICO
APRIL 2015

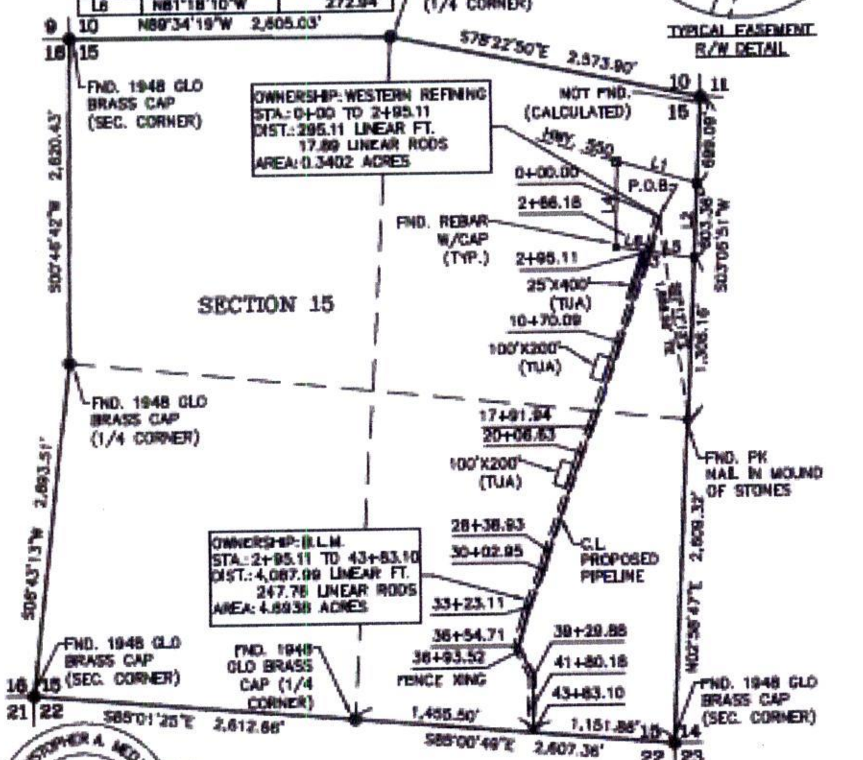
NOTES:

1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.

LINE	BEARING	DISTANCE
L1	S74°10'39"E	678.51'
L2	S03°05'51"W	603.36'
L3	N81°18'10"W	639.73'
L4	N01°00'38"E	690.86'
L5	N81°18'10"W	366.80'
L6	N81°18'10"W	272.94'



TYPICAL EASEMENT R/W DETAIL



STATIONING AND BEARING TABLE

STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
0+00.00				
	S15°45'37"W	266.18'		
2+66.18			00°36'16"	Right
	S16°21'52"W	803.91'		
10+70.09			00°17'46"	Left
	S18°04'05"W	711.85'		
17+81.94			01°51'36"	Right
	S20°08'20"W	224.89'		
20+06.83			01°53'40"	Left
	S16°01'49"W	832.10'		
28+38.93			04°18'15"	Left
	S15°41'33"W	164.02'		
30+02.95			06°47'38"	Right
	S22°28'12"W	320.16'		
33+23.11			06°06'48"	Left
	S16°20'34"W	331.60'		
36+54.71			43°07'03"	Left
	S27°28'39"E	275.17'		
39+29.88			30°06'15"	Right
	S02°28'26"W	250.30'		
41+80.18			04°37'14"	Left
	S01°07'36"E	202.92'		
43+83.10				

CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR

I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.

[signature] May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702 — Date

TERRA LAND SURVEYS, LLC
P.O. BOX 2341 * CORRALES, NM 87048 * (505) 792-8117

TERRA

SCALE 0 500 1000
(IN FEET)
1 inch = 1000 ft.

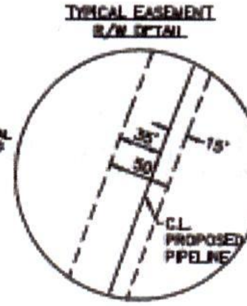
SHEET 1 OF 18

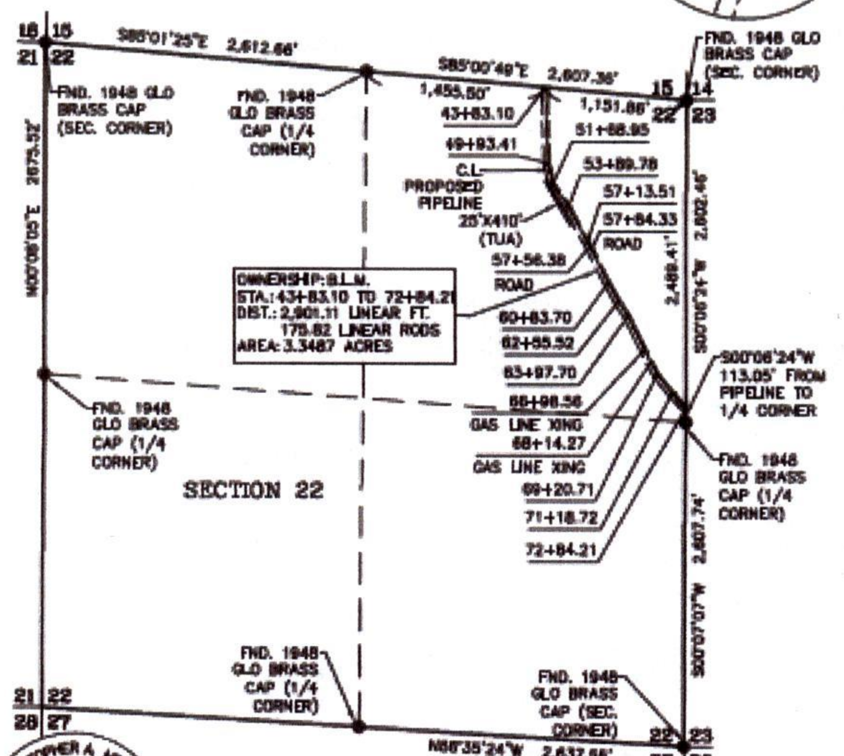
WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 22
T.23N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015

NOTES:

1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.

TYPICAL EASEMENT R/W DETAIL





CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR

STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
43+83.10				
	S01°57'38"E	610.31'		
49+93.41			11°48'26"	Left
	S13°46'04"E	175.54'		
51+68.95			21°00'13"	Left
	S34°46'17"E	220.83'		
53+89.78			06°03'01"	Right
	S28°43'17"E	323.73'		
57+13.51			01°38'44"	Right
	S27°04'33"E	370.19'		
60+83.70			01°59'12"	Left
	S29°03'45"E	171.82'		
62+55.52			03°08'21"	Left
	S32°12'08"E	142.18'		
63+97.70			03°27'23"	Right
	S28°44'42"E	523.01'		
69+20.71			13°08'01"	Left
	S08°52'44"E	198.01'		
71+18.72			33°23'26"	Left
	S42°16'10"E	165.49'		
72+84.21				

STATIONING AND BEARING TABLE

I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.

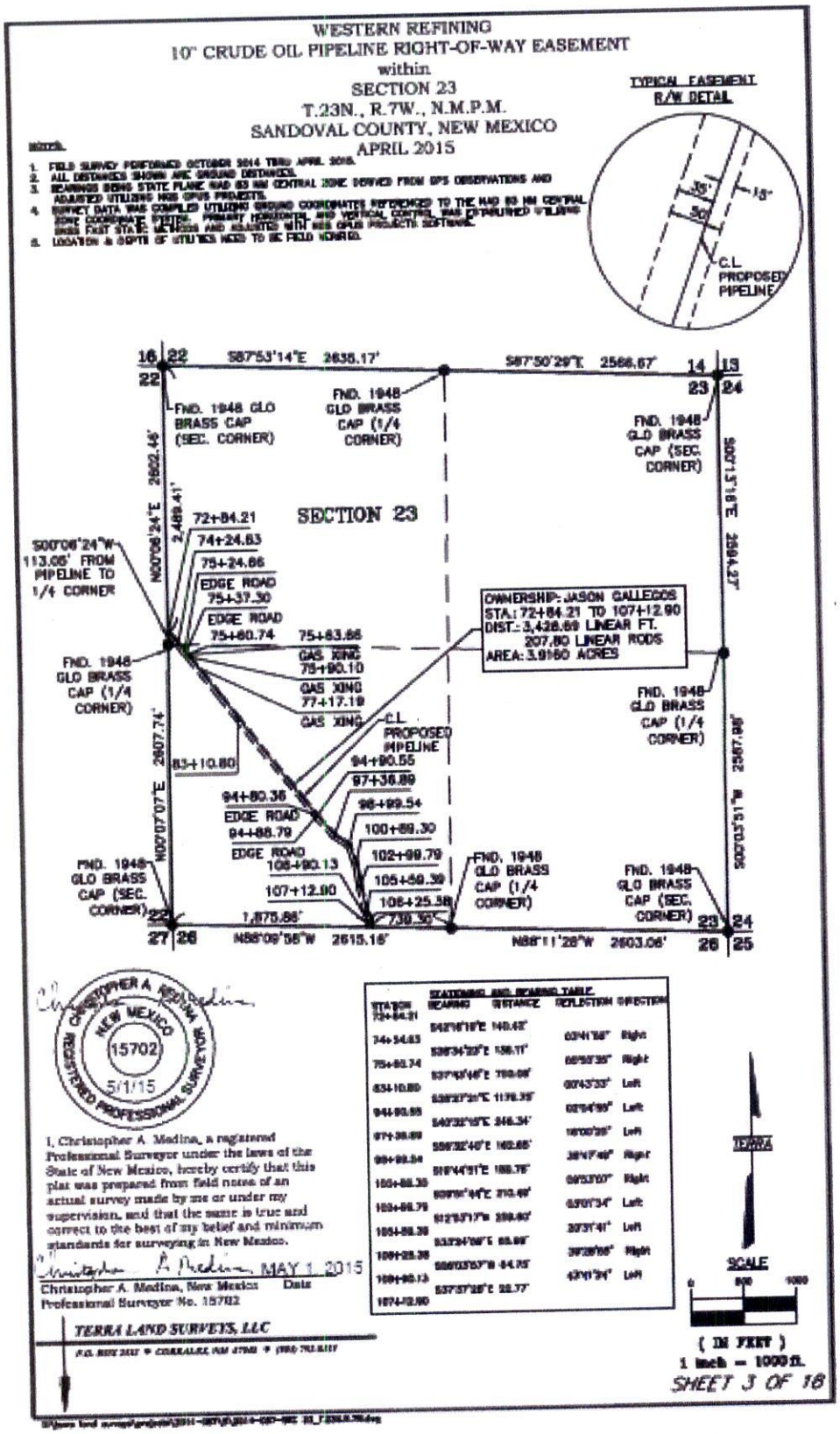
Christopher A. Medina May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702 — Date

TERRA LAND SURVEYS, LLC
P.O. BOX 2117 • CORRALES, NM 87048 • (505) 792-8417

TERRA

SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.

SHEET 2 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 23
T.23N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING NGS FIRST STATIC OBSERVATIONS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
TYPICAL EASEMENT R/W DETAIL
15'
30'
15'
C.L. PROPOSED PIPELINE
SECTION 23
FND. 1948 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
S87°53'14"E 2635.17'
S87°50'29"E 2566.67'
N88°09'56"W 2615.16'
N88°11'28"W 2603.06'
N00°06'24"E 2662.46'
N00°07'07"E 2807.74'
S00°13'18"E 2564.27'
S00°13'51"E 2567.98'
S00°06'24"W 113.05' FROM PIPELINE TO 1/4 CORNER
72+84.21
74+24.83
75+24.66
EDGE ROAD 75+37.30
EDGE ROAD 75+80.74
75+83.66
GAS XING 76+90.10
GAS XING 77+17.19
GAS XING
83+10.80
94+80.36
EDGE ROAD 94+88.79
EDGE ROAD 106+90.13
107+12.90
1,875.88'
C.L. PROPOSED PIPELINE
94+90.55
97+36.89
98+99.54
100+89.30
102+99.79
105+59.39
106+25.38
739.50'
OWNERSHIP: JASON GALLEGOS
STA.: 72+84.21 TO 107+12.90
DIST.: 3,426.69 LINEAR FT.
207.80 LINEAR RODS
AREA: 3.9160 ACRES
STATIONING AND BEARING TABLE
STATION
BEARING
DISTANCE
DEFLECTION
DIRECTION
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
REGISTERED PROFESSIONAL SURVEYOR
5/1/15
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
MAY 1 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
TERRA
SCALE
0
500
1000
(IN FEET)
1 inch = 1000 ft.
SHEET 3 OF 18

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 26
T.23N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015

NOTES:

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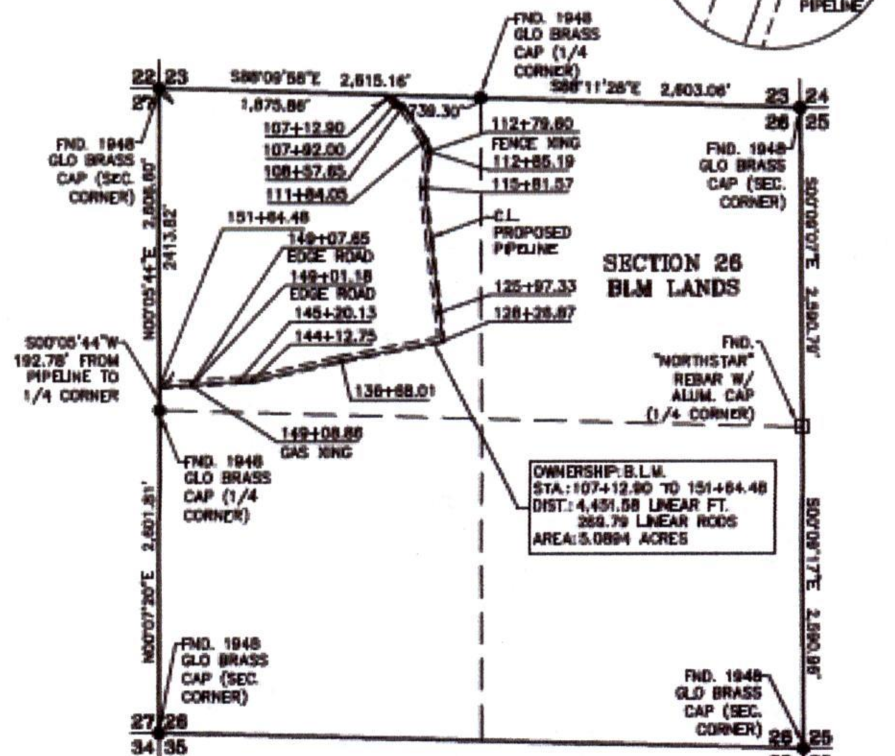
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.



STATIONING AND BEARING TABLE

STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
107+12.90				
	S37°37'28"E	79.10'		
107+92.00			28°38'40"	Left
	S84°16'08"E	65.65'		
108+57.65			30°27'42"	Right
	S33°48'26"E	326.40'		
111+84.05			17°51'16"	Right
	S16°07'10"E	101.14'		
112+85.19			25°45'00"	Right
	S08°47'50"W	296.38'		
115+81.57			10°42'03"	Left
	S08°34'13"E	1015.76'		
125+97.33			01°07'18"	Right
	S09°48'34"E	229.54'		
128+26.87			84°04'02"	Right
	S78°07'08"W	841.14'		
136+68.01			02°08'26"	Left
	S77°08'42"W	744.74'		
144+12.75			11°47'30"	Right
	S88°04'12"W	107.38'		
145+20.13			03°18'46"	Left
	S83°34'36"W	381.05'		
149+01.18			02°10'33"	Right
	S87°44'56"W	263.30'		
151+64.48				

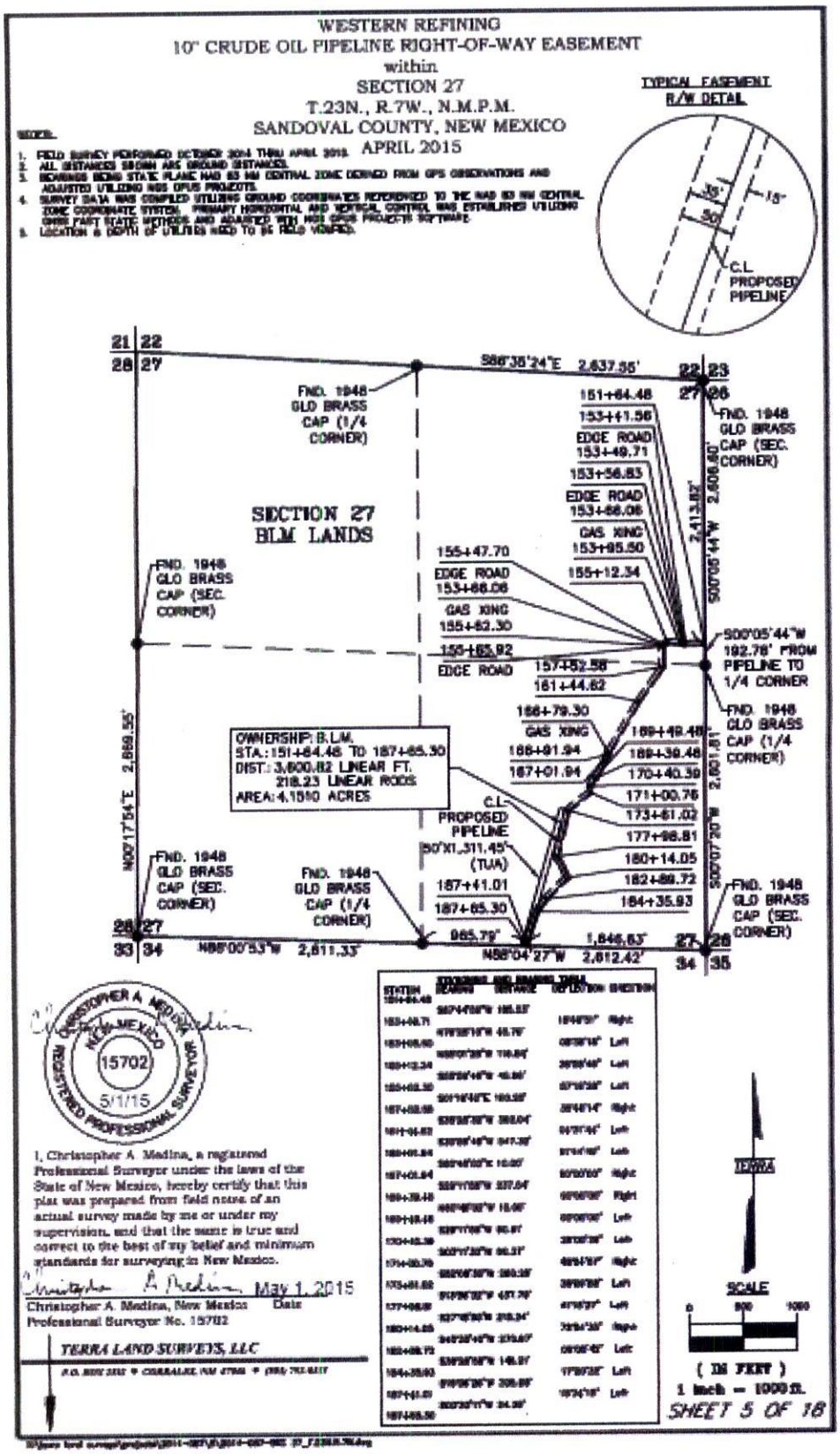
Christopher A. Medina
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR

I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.

Christopher A. Medina May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702 Date

TERRA LAND SURVEYS, LLC

SHEET 4 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 27
T.23N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015
NOTES:
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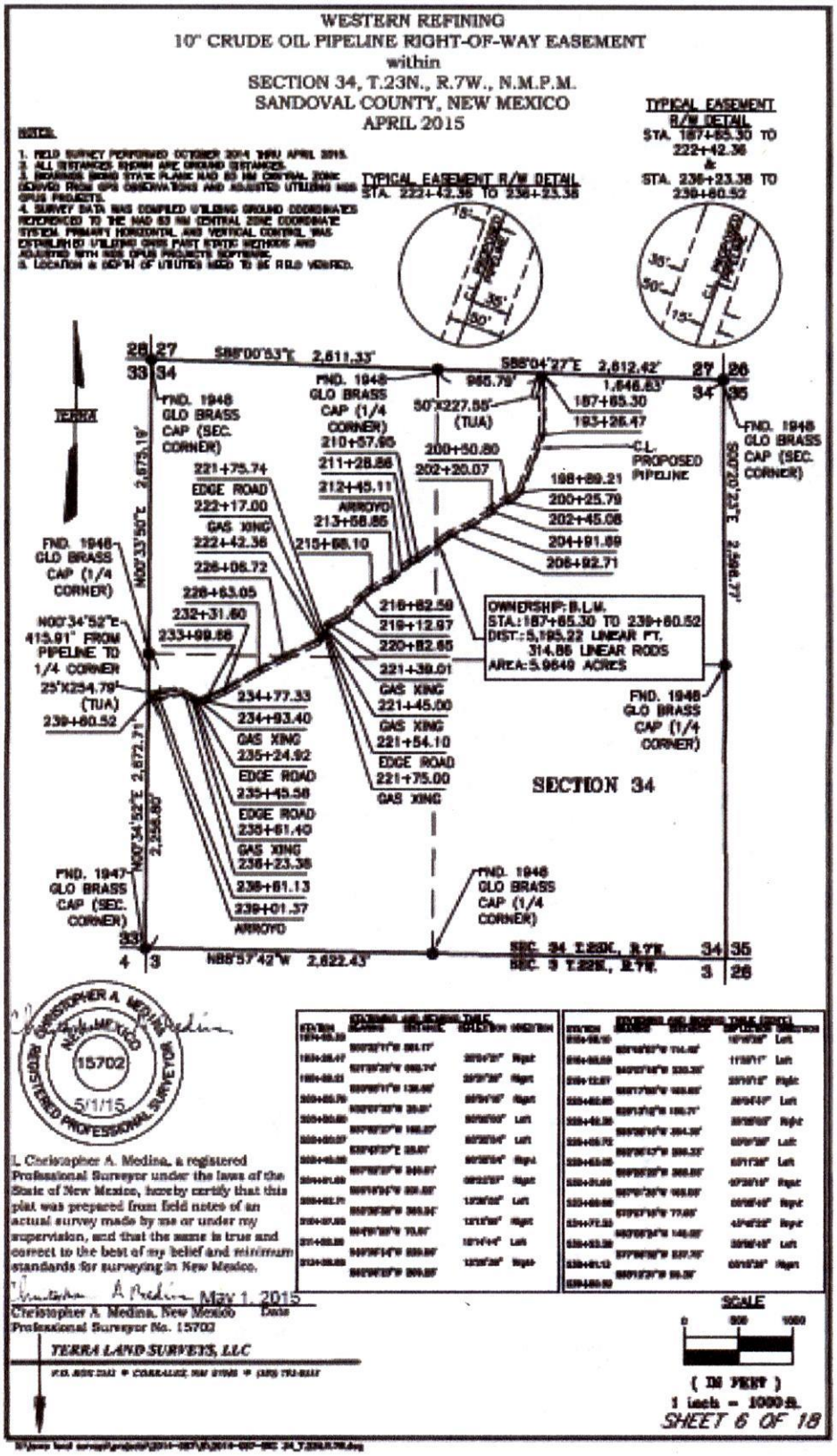
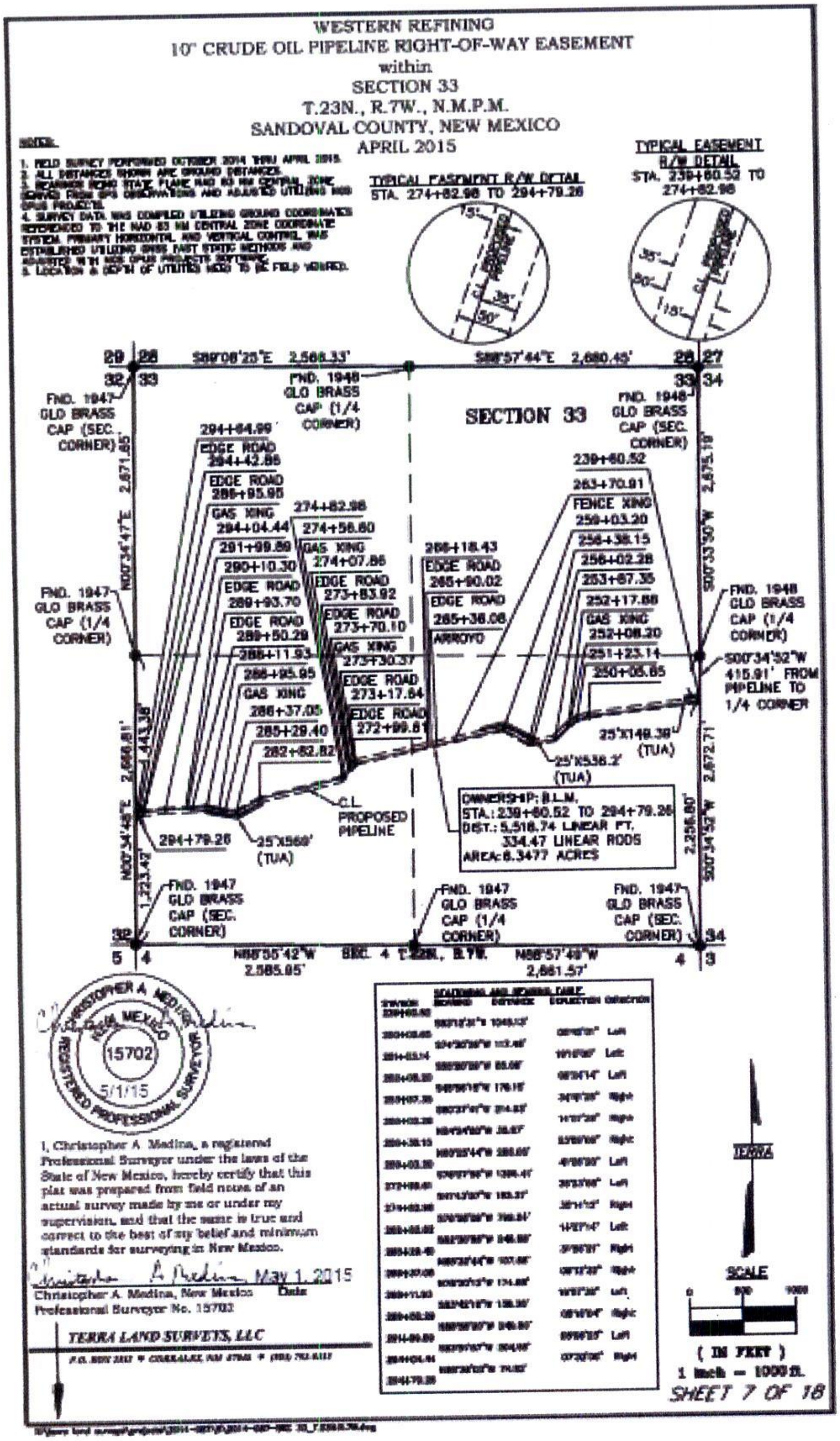
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
TYPICAL EASEMENT R/W DETAIL
35'
15'
50'
C.L. PROPOSED PIPELINE
SECTION 27
BLM LANDS
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
S86°38'24"E 2,637.55'
N00°17'54"E 2,659.55'
N88°00'53"W 2,611.33'
N88°04'27"W 2,612.42'
S00°05'44"W 2,606.60'
S00°07'20"W 2,601.81'
151+64.48
153+11.56
EDGE ROAD 153+49.71
153+56.83
EDGE ROAD 153+66.06
GAS XING 153+85.50
155+12.34
155+47.70
EDGE ROAD 153+66.06
GAS XING 155+62.30
156+65.92
EDGE ROAD
157+52.58
161+44.62
166+79.30
GAS XING
166+81.94
167+01.94
169+49.48
169+39.48
170+40.39
171+00.76
173+61.02
177+98.81
180+14.05
182+89.72
184+35.93
OWNERSHIP: B.L.M.
STA.: 151+64.48 TO 187+65.30
DIST.: 3,600.82 LINEAR FT.
218.23 LINEAR RODS
AREA: 4.1510 ACRES
C.L. PROPOSED PIPELINE
50'X1,311.45' (TUA)
187+41.01
187+65.30
985.79'
1,846.63'
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
TERRA
SCALE
0 500 1000
(IN FEET)
1 Inch = 1000 ft.
SHEET 5 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 34, T.23N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015
TYPICAL EASEMENT R/W DETAIL
STA. 187+65.30 TO 222+42.36
&
STA. 236+23.38 TO 239+80.52
TYPICAL EASEMENT R/W DETAIL
STA. 222+42.36 TO 236+23.38
TERRA
FND. 1948 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
S88°00'53"E 2,611.33'
S88°04'27"E 2,612.42'
1,646.83'
965.79'
50'X227.55' (TUA)
C.L. PROPOSED PIPELINE
N00°33'50"E 2,675.19'
S00°20'23"E 2,656.77'
N00°34'52"E 2,672.71'
N00°34'52"E 415.91' FROM PIPELINE TO 1/4 CORNER
25'X254.79' (TUA)
239+80.52
N88°57'42"W 2,622.43'
OWNERSHIP: B.L.M.
STA.: 187+65.30 TO 239+80.52
DIST.: 5,195.22 LINEAR FT.
314.86 LINEAR RODS
AREA: 5.9649 ACRES
SECTION 34
187+65.30
193+26.47
198+89.21
200+25.79
202+45.08
204+91.89
206+92.71
210+57.95
211+28.86
212+45.11
ARROYO
213+58.85
215+88.10
216+82.59
219+12.97
220+82.85
221+39.01
GAS XING
221+45.00
GAS XING
221+54.10
EDGE ROAD
221+75.00
GAS XING
221+75.74
EDGE ROAD
222+17.00
GAS XING
222+42.36
226+06.72
226+63.05
232+31.60
233+89.88
234+77.33
234+93.40
GAS XING
235+24.92
EDGE ROAD
235+45.58
EDGE ROAD
236+61.40
GAS XING
236+23.38
236+81.13
239+01.37
ARROYO
SEC. 34 T.23N., R.7W.
SEC. 3 T.22N., R.7W.
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
REGISTERED PROFESSIONAL SURVEYOR
5/1/15
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15703
Date
TERRA LAND SURVEYS, LLC
SCALE
0
500
1000
(IN FEET)
1 inch = 1000 ft.
SHEET 6 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 33
T.23N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015
NOTES:
TYPICAL EASEMENT R/W DETAIL
STA. 274+82.98 TO 294+79.26
TYPICAL EASEMENT R/W DETAIL
STA. 239+60.52 TO 274+82.98
S89°08'25"E 2,568.33'
S89°57'44"E 2,680.45'
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
SECTION 33
294+64.99
EDGE ROAD
294+42.86
EDGE ROAD
289+95.95
GAS XING
294+04.44
291+99.89
290+10.30
EDGE ROAD
289+93.70
EDGE ROAD
289+50.29
288+11.93
286+95.95
GAS XING
286+37.05
285+29.40
282+82.82
274+82.98
274+56.60
GAS XING
274+07.86
EDGE ROAD
273+83.92
EDGE ROAD
273+70.10
GAS XING
273+30.37
EDGE ROAD
273+17.64
EDGE ROAD
272+99.61
266+18.43
EDGE ROAD
265+90.02
EDGE ROAD
265+38.08
ARROYO
239+60.52
263+70.91
FENCE XING
259+03.20
256+38.15
256+02.28
253+67.35
252+17.88
GAS XING
252+08.20
251+23.14
250+05.65
N00°34'47"E 2,671.85'
S00°33'50"W 2,675.19'
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (1/4 CORNER)
S00°34'32"W 415.91' FROM PIPELINE TO 1/4 CORNER
25'X149.38' (TUA)
25'X536.2' (TUA)
C.L. PROPOSED PIPELINE
294+79.26
25'X569' (TUA)
OWNERSHIP: B.L.M.
STA.: 239+60.52 TO 294+79.26
DIST.: 5,518.74 LINEAR FT.
334.47 LINEAR RODS
AREA: 6.3477 ACRES
N00°34'48"E 2,666.81'
1,443.38'
1,223.42'
S00°34'52"W 2,672.71'
2,256.80'
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
N88°55'42"W 2,585.85'
SEC. 4 T.22N., R.7W.
N88°57'49"W 2,661.57'
29 28 32 33
28 27 33 34
32 33 5 4
33 34 4 3
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR
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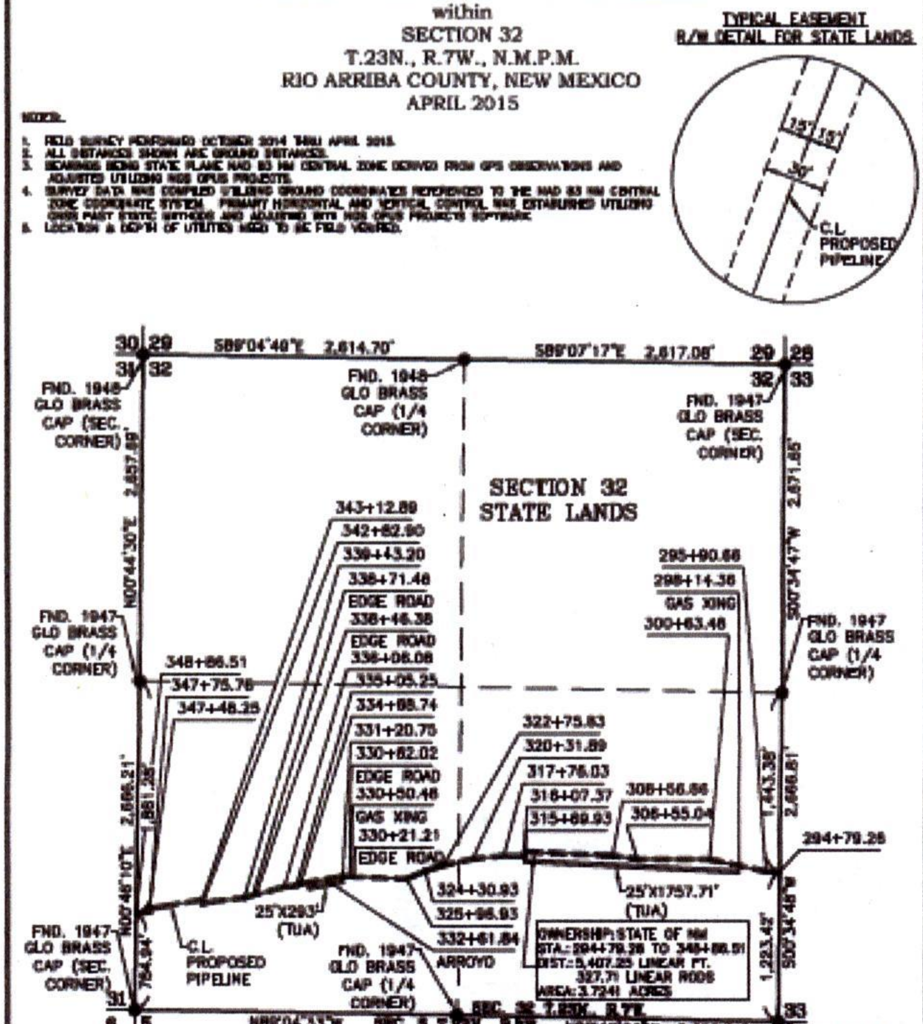
May 1, 2015
Date
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
TERRA LAND SURVEYS, LLC
TERRA
SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.
SHEET 7 OF 18

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 32
T.23N., R.7W., N.M.P.M.
RIO ARRIBA COUNTY, NEW MEXICO
APRIL 2015

NOTES:

1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.



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[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Right
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Right
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Right
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Right
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Right
	[illegible]	[illegible]		
[illegible]			[illegible]	Right
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Left
	[illegible]	[illegible]		
[illegible]			[illegible]	Right
	[illegible]	[illegible]		
[illegible]				

CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR

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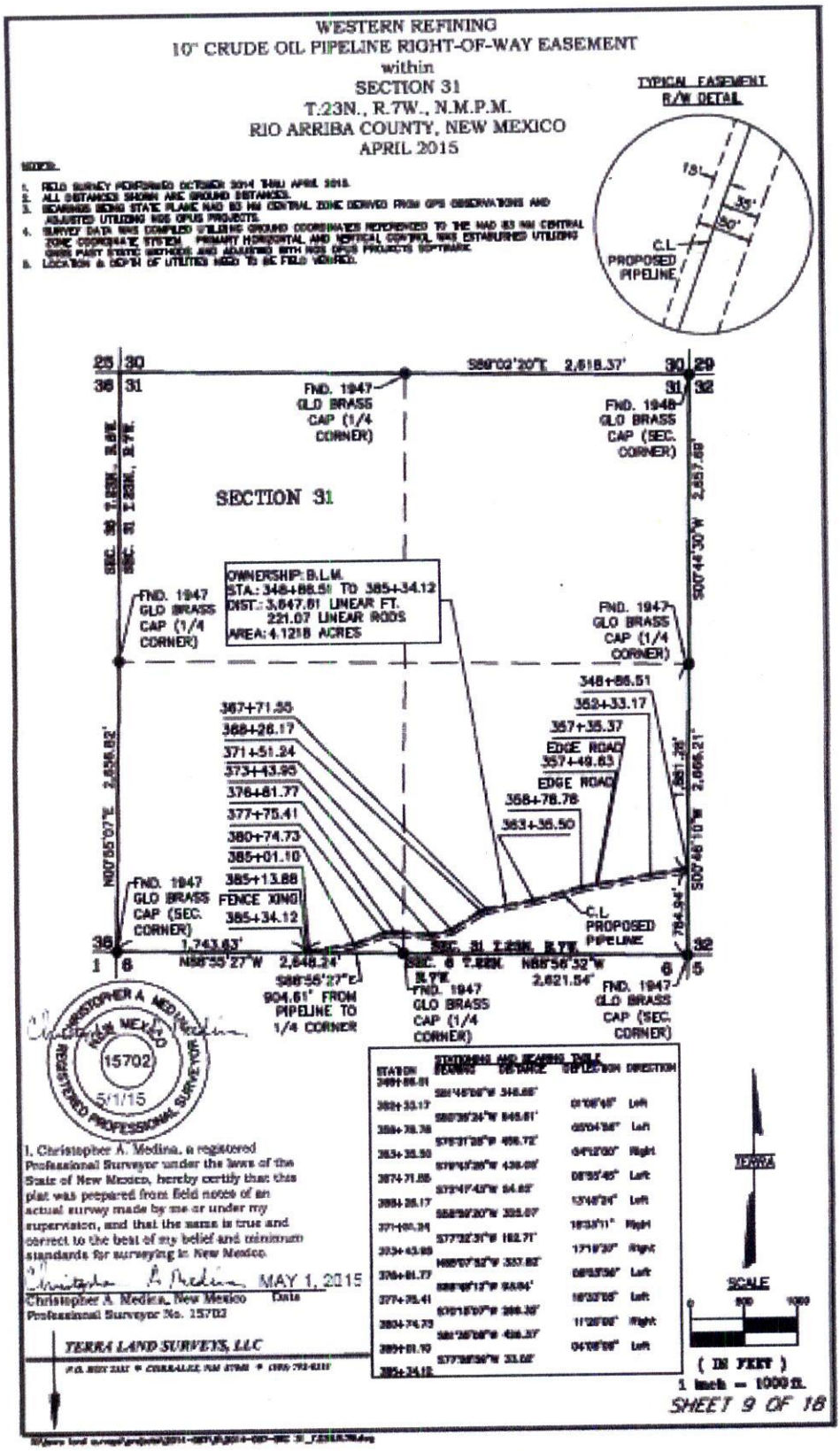
Christopher A. Medina, New Mexico Professional Surveyor No. 15702 — Date: May 1, 2015

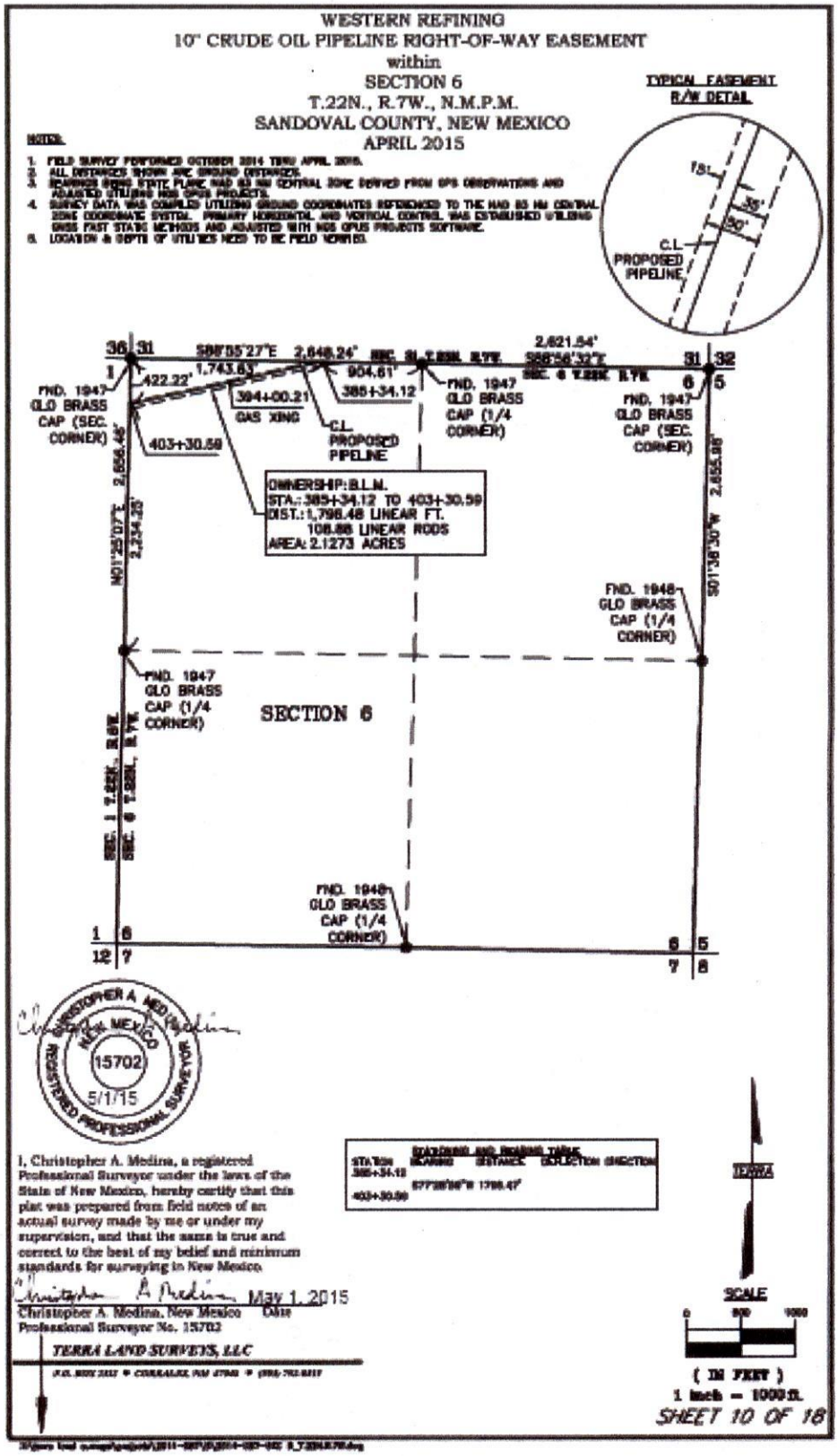
TERRA LAND SURVEYS, LLC

TERRA

SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.

SHEET 8 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 31
T.23N., R.7W., N.M.P.M.
RIO ARRIBA COUNTY, NEW MEXICO
APRIL 2015
TYPICAL EASEMENT R/W DETAIL
15'
35'
50'
C.L. PROPOSED PIPELINE
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FIRST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
S89°02'20"E 2,618.37'
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1948 GLO BRASS CAP (SEC. CORNER)
SECTION 31
OWNERSHIP: B.L.M.
STA.: 348+88.51 TO 385+34.12
DIST.: 3,647.61 LINEAR FT.
221.07 LINEAR RODS
AREA: 4.1218 ACRES
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
348+88.51
352+33.17
357+35.37
EDGE ROAD
357+49.83
EDGE ROAD
358+78.78
363+36.50
367+71.55
368+26.17
371+51.24
373+43.95
376+81.77
377+75.41
380+74.73
385+01.10
385+13.88
FENCE XING
385+34.12
FND. 1947 GLO BRASS CAP (SEC. CORNER)
1,743.63'
N88°55'27"W 2,648.24'
S88°56'27"E 904.61' FROM PIPELINE TO 1/4 CORNER
C.L. PROPOSED PIPELINE
N88°56'32"W 2,621.54'
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
N00°05'07"E 2,636.82'
S00°44'30"W 2,667.66'
S00°46'10"W 2,666.21'
784.94'
1,881.28'
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
MAY 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
STATIONING AND BEARING TABLE
STATION
BEARING
DISTANCE
DEFLECTION
DIRECTION
348+88.51
352+33.17
358+78.78
363+36.50
367+71.55
368+26.17
371+51.24
373+43.95
376+81.77
377+75.41
380+74.73
385+01.10
385+13.88
385+34.12
TERRA
SCALE
0
500
1000
(IN FEET)
1 inch = 1000 ft.
SHEET 9 OF 18

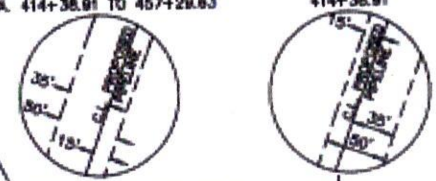

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 6
T.22N., R.7W., N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
APRIL 2015
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS ARE GRID STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
TYPICAL EASEMENT R/W DETAIL
15'
35'
30'
C.L. PROPOSED PIPELINE
S88°55'27"E 2,648.24'
1,743.63'
422.22'
904.61'
2,621.54'
S88°56'32"E
FND. 1947 GLO BRASS CAP (SEC. CORNER)
384+00.21
GAS XING
385+34.12
C.L. PROPOSED PIPELINE
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
403+30.59
OWNERSHIP: B.L.M.
STA.: 385+34.12 TO 403+30.59
DIST.: 1,796.48 LINEAR FT.
108.88 LINEAR RODS
AREA: 2.1273 ACRES
N01°29'07"E 2,334.25'
2,656.46'
S01°36'30"W 2,655.98'
FND. 1948 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
SECTION 6
SEC. 1 T.22N., R.8W.
SEC. 6 T.22N., R.7W.
FND. 1948 GLO BRASS CAP (1/4 CORNER)
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
REGISTERED PROFESSIONAL SURVEYOR
5/1/15
STATION
BEARING
DISTANCE
DEFLECTION DIRECTION
385+34.12
403+30.59
S77°38'56"W 1796.47'
TERRA
SCALE
0
500
1000
(IN FEET)
1 inch = 1000 ft.
SHEET 10 OF 18
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC

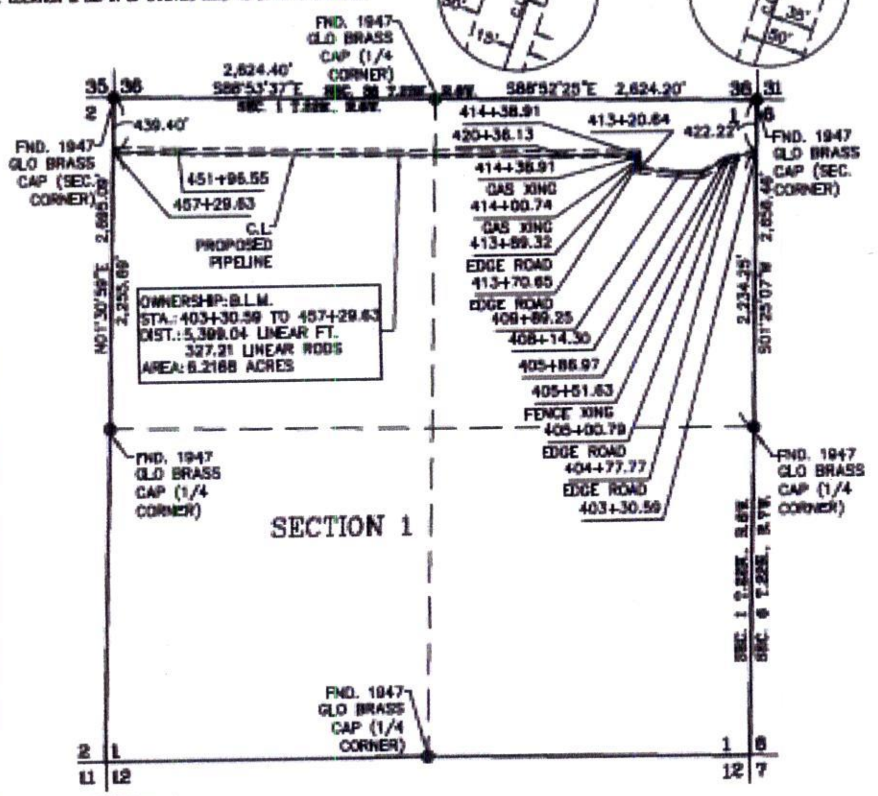
WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 1
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015

NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS SHOWN STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.

TYPICAL EASEMENT R/W DETAIL
STA. 414+38.91 TO 457+29.63

TYPICAL EASEMENT R/W DETAIL
STA. 403+30.59 TO 414+38.91





STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
403+30.59				
	S77°38'59"E	256.38'		
405+86.97			18°08'13"	Left
	S89°19'46"W	227.33'		
408+14.30			30°13'53"	Right
	N88°28'21"W	174.95'		
409+89.25			05°28'14"	Right
	N02°00'07"W	331.39'		
413+20.64			76°18'29"	Right
	N04°38'38"W	118.37'		
414+38.91			84°00'07"	Left
	N89°24'35"W	597.32'		
420+38.13			00°32'38"	Right
	N88°41'57"W	3160.42'		
451+96.55			00°33'43"	Right
	N88°08'47"W	533.08'		
457+29.63				

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May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702 — Date

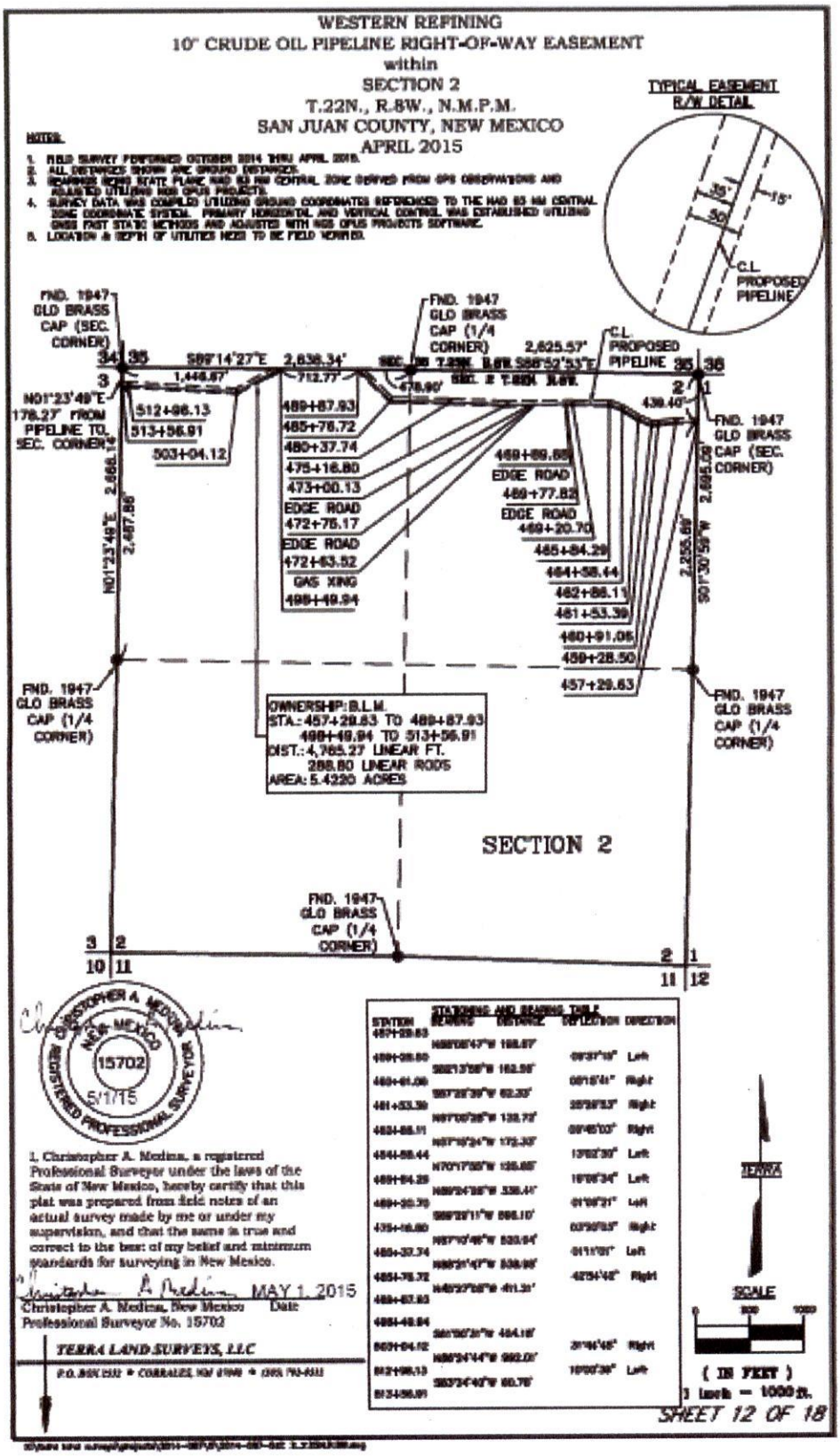
CHRISTOPHER A. MEDINA, NEW MEXICO, REGISTERED PROFESSIONAL SURVEYOR, 15702, 5/1/15

TERRA LAND SURVEYS, LLC

TERRA

SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.

SHEET 11 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 2
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS HORIZONTAL STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
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5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
TYPICAL EASEMENT R/W DETAIL
35'
15'
50'
C.L. PROPOSED PIPELINE
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
S89°14'27"E 2,636.34'
2,625.57'
C.L. PROPOSED PIPELINE
N01°23'49"E 178.27' FROM PIPELINE TO SEC. CORNER
1,448.87'
712.77'
478.90'
439.40'
512+96.13
513+56.91
503+04.12
489+87.93
485+76.72
480+37.74
475+16.80
473+00.13
EDGE ROAD
472+75.17
EDGE ROAD
472+63.52
GAS XING
469+49.94
469+89.88
EDGE ROAD
469+77.82
EDGE ROAD
469+20.70
465+84.29
464+58.44
462+86.11
461+53.39
460+91.05
459+28.50
457+29.63
N01°23'49"E 2,667.86'
S01°30'59"W 2,695.06'
2,255.69'
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
OWNERSHIP: B.L.M.
STA.: 457+29.63 TO 489+87.93
498+49.94 TO 513+56.91
DIST.: 4,765.27 LINEAR FT.
288.80 LINEAR RODS
AREA: 5.4220 ACRES
SECTION 2
FND. 1947 GLO BRASS CAP (1/4 CORNER)
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
REGISTERED PROFESSIONAL SURVEYOR
5/1/15
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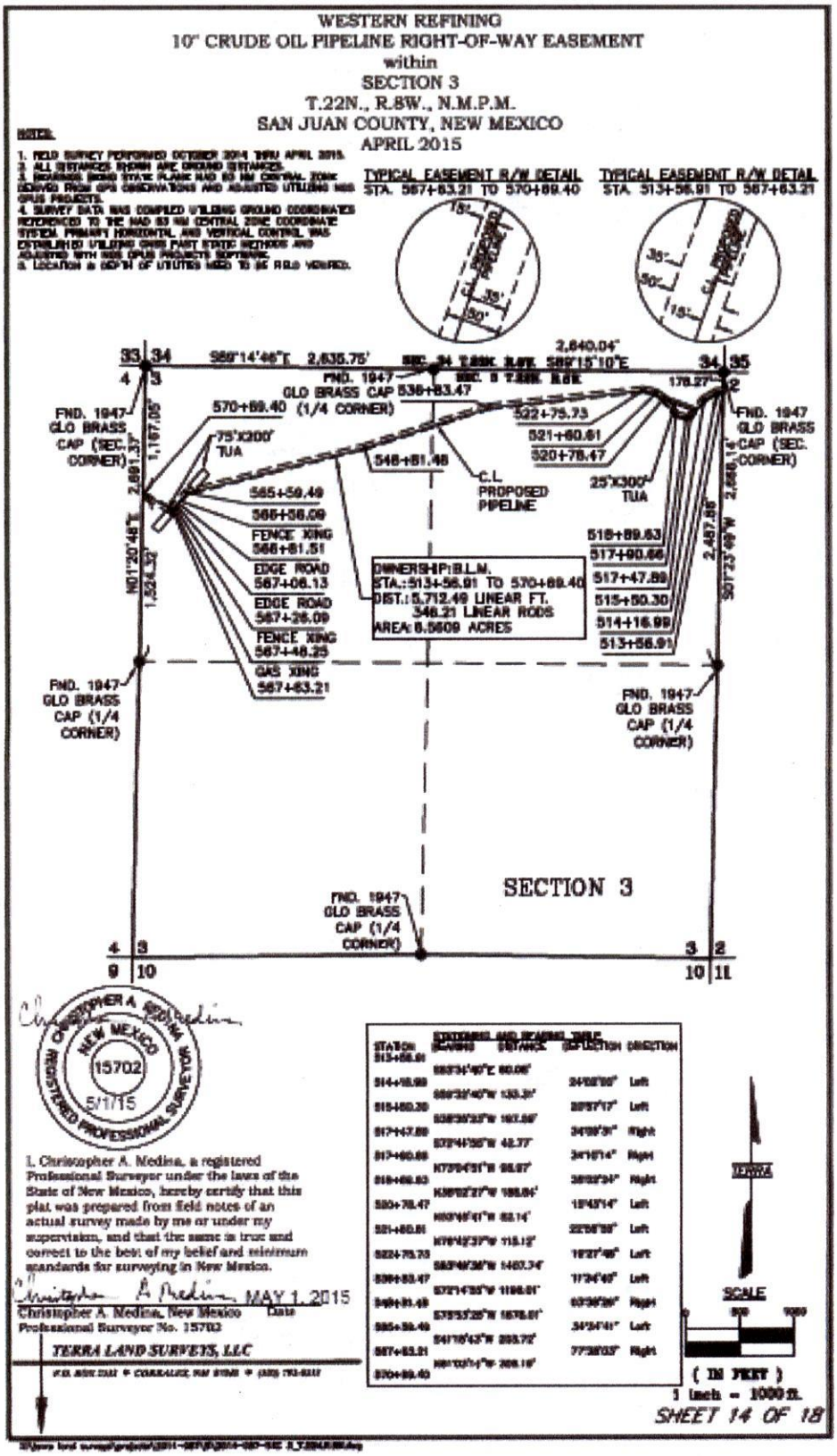
MAY 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
P.O. BOX 1312 • CORRALES, NM 87048 • (505) 792-8111
STATIONING AND BEARING TABLE
STATION
BEARING
DISTANCE
DEFLECTION
DIRECTION
TERRA
SCALE
0
1000
(IN FEET)
1 inch = 1000 ft.
SHEET 12 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 3
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
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3. BEARINGS BASED STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
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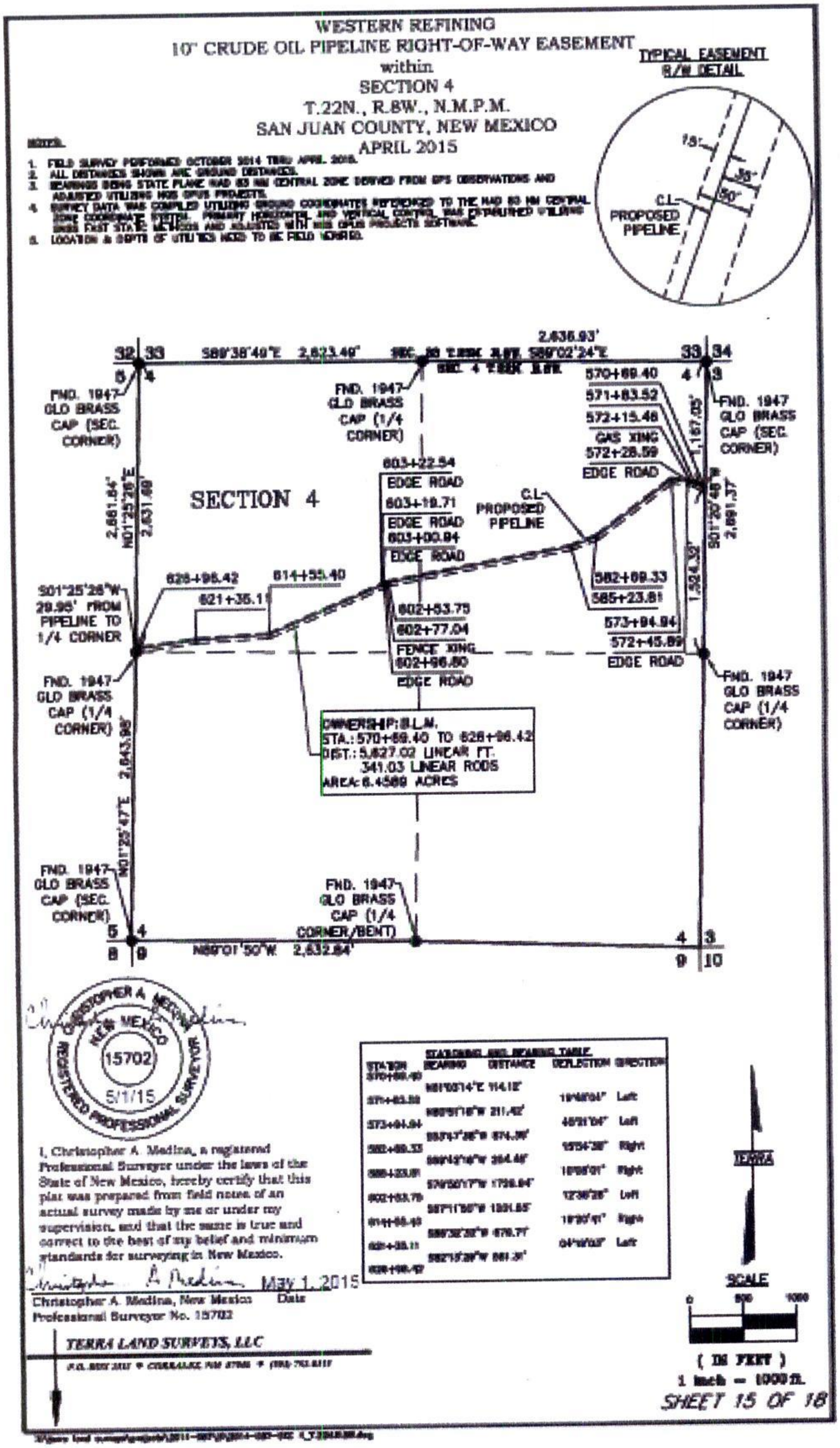
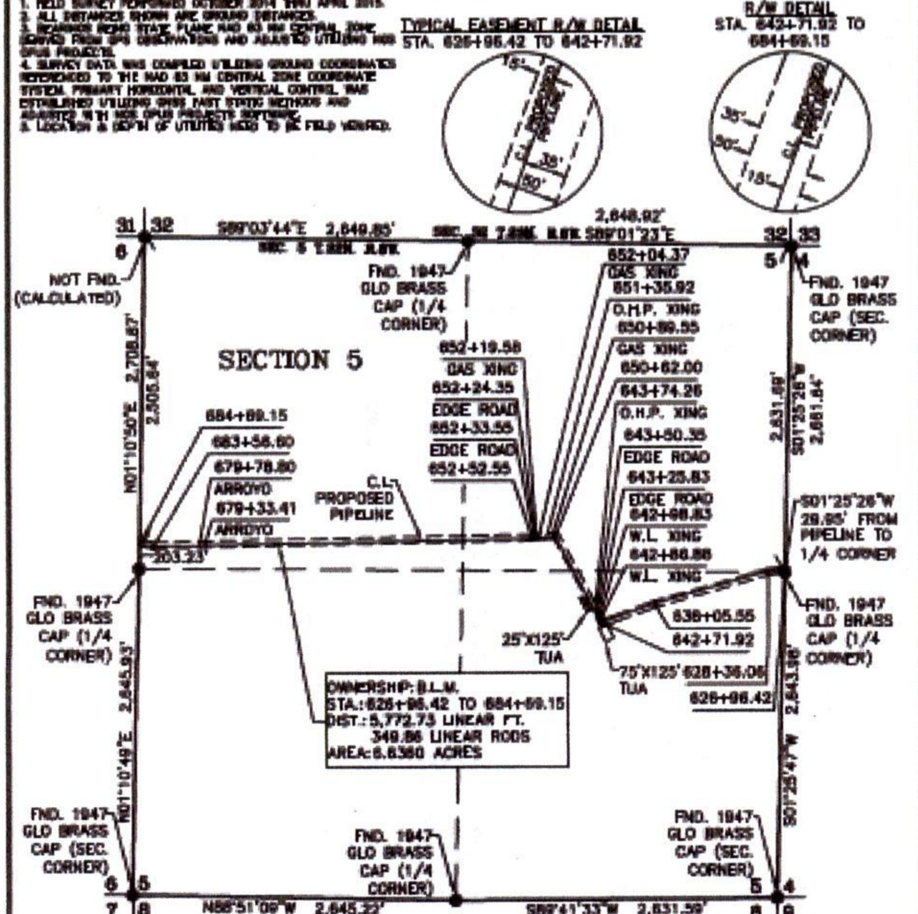
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
TYPICAL EASEMENT R/W DETAIL
STA. 567+83.21 TO 570+89.40
TYPICAL EASEMENT R/W DETAIL
STA. 513+56.91 TO 567+63.21
S89°14'46"E 2,635.75'
2,640.04'
S89°15'10"E
FND. 1947 GLO BRASS CAP 536+83.47
570+89.40 (1/4 CORNER)
178.27'
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
75'X200' TUA
522+75.75
521+60.61
520+76.47
548+81.48
C.L. PROPOSED PIPELINE
25'X300' TUA
565+59.49
566+56.09
FENCE XING 566+81.51
EDGE ROAD 567+06.13
EDGE ROAD 567+26.09
FENCE XING 567+48.25
GAS XING 567+63.21
518+89.63
517+90.66
517+47.89
515+50.30
514+16.99
513+56.91
OWNERSHIP: B.L.M.
STA.: 513+56.91 TO 570+89.40
DIST.: 5,712.49 LINEAR FT.
346.21 LINEAR RODS
AREA: 8.5609 ACRES
N01°20'48"E 1,524.30'
2,691.33'
1,167.05'
S01°23'49"W 2,487.85'
2,666.14'
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
SECTION 3
FND. 1947 GLO BRASS CAP (1/4 CORNER)
33 34 35
4 3 2
9 10 11
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
MAY 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
STATION
BEARING
DISTANCE
DEFLECTION
DIRECTION
513+56.91
514+16.99
515+50.30
517+47.89
517+90.66
518+89.63
520+76.47
521+60.61
522+75.75
536+83.47
546+81.48
565+59.49
566+56.09
567+63.21
570+89.40
Left
Left
Right
Right
Right
Left
Left
Left
Right
Left
Right
TERRA
SCALE
(IN FEET)
1 inch = 1000 ft.
SHEET 14 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 4
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015
TYPICAL EASEMENT R/W DETAIL
C.L. PROPOSED PIPELINE
SECTION 4
S89°38'49"E 2,623.49'
2,636.93'
S89°02'24"E
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
570+69.40
571+83.52
572+15.46
GAS XING
572+28.59
EDGE ROAD
603+22.54
EDGE ROAD
603+19.71
EDGE ROAD
603+00.94
EDGE ROAD
C.L. PROPOSED PIPELINE
582+69.33
585+23.81
573+94.94
572+45.89
EDGE ROAD
626+96.42
614+55.40
621+35.11
S01°25'26"W 29.95' FROM PIPELINE TO 1/4 CORNER
602+53.75
602+77.04
FENCE XING
602+96.80
EDGE ROAD
N01°25'26"E 2,631.60'
2,861.64'
S01°20'46"E 2,691.37'
1,167.05'
1,524.32'
OWNERSHIP: B.L.M.
STA.: 570+69.40 TO 626+96.42
DIST.: 5,627.02 LINEAR FT.
341.03 LINEAR RODS
AREA: 6.4589 ACRES
N01°25'47"E 2,643.98'
FND. 1947 GLO BRASS CAP (1/4 CORNER/BENT)
N89°01'50"W 2,632.84'
STATIONING AND BEARING TABLE
STATION BEARING DISTANCE DEFLECTION DIRECTION
CHRISTOPHER A. MEDINA NEW MEXICO 15702 REGISTERED PROFESSIONAL SURVEYOR 5/1/15
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.
SHEET 15 OF 18

WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 5
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015

NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BASED ON STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.



STATION	BEARING	DISTANCE	DEFLECTION	DIRECTION
626+96.42				
	S82°13'28"W	139.64'		
628+36.06			07°51'08"	Left
	S74°22'20"W	969.49'		
638+05.55			03°43'39"	Left
	S70°38'41"W	466.37'		
642+71.92			81°35'08"	Right
	N37°46'11"W	790.08'		
650+62.00			88°53'41"	Left
	S85°20'08"W	190.55'		
652+52.55			03°38'43"	Right
	S88°58'51"W	3104.05'		
683+56.60			11°33'50"	Right
	N79°28'19"W	112.55'		
684+69.15				

STAKING AND BEARING TABLE

CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR

I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.

Christopher A. Medina — May 1, 2015

Christopher A. Medina, New Mexico Professional Surveyor No. 15702 — Date

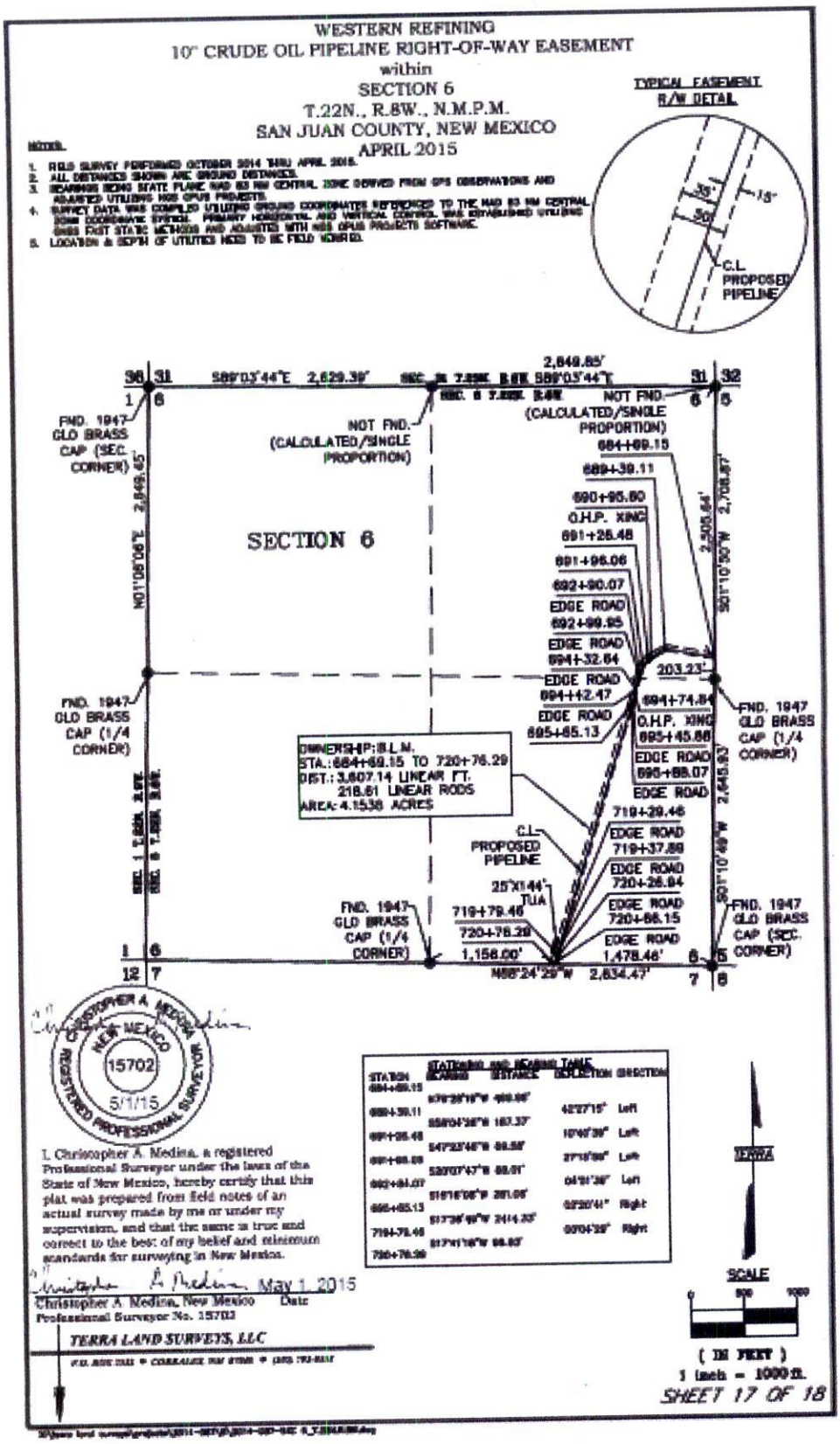
TERRA

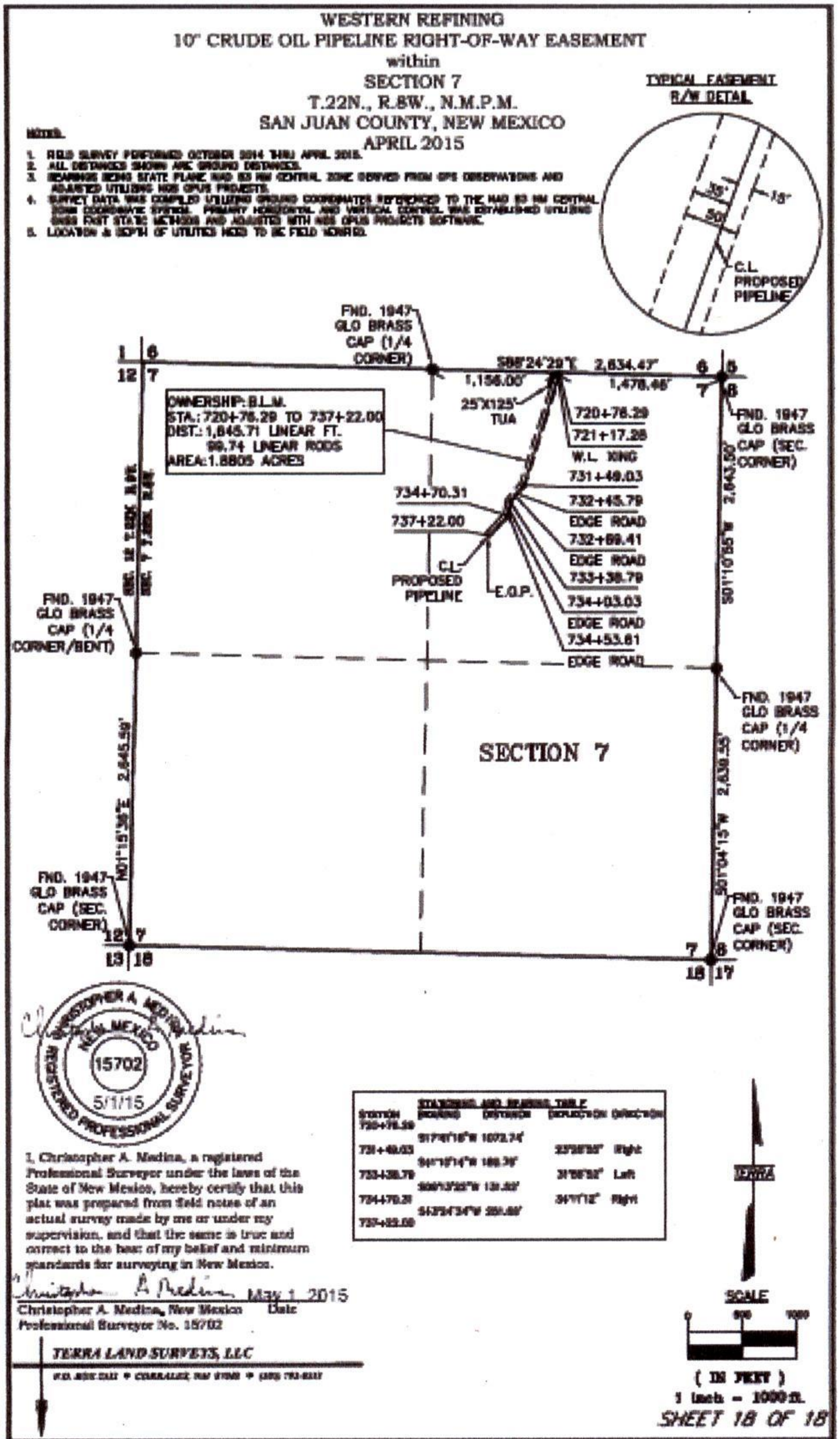
SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.

TERRA LAND SURVEYS, LLC

P.O. BOX 2112 • CORRALES, NM 87048 • (505) 792-6317

SHEET 16 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 6
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
4. SURVEY DATA WAS COMPILED UTILIZING GROUND COORDINATES REFERENCED TO THE NAD 83 NM CENTRAL ZONE COORDINATE SYSTEM. PRIMARY HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GNSS FAST STATIC METHODS AND ADJUSTED WITH NGS OPUS PROJECTS SOFTWARE.
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
TYPICAL EASEMENT R/W DETAIL
30'
15'
50'
C.L. PROPOSED PIPELINE
2,649.85'
S89°03'44"E 2,629.39'
S89°03'44"E
NOT FND. (CALCULATED/SINGLE PROPORTION)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
NOT FND. (CALCULATED/SINGLE PROPORTION)
SECTION 6
N01°08'06"E 2,649.45'
S01°10'50"W 2,708.87'
684+69.15
689+39.11
690+95.80
O.H.P. XING
691+26.48
691+96.06
692+90.07
EDGE ROAD
692+99.95
EDGE ROAD
694+32.64
EDGE ROAD
694+42.47
EDGE ROAD
695+85.13
203.23'
694+74.84
O.H.P. XING
695+45.86
EDGE ROAD
696+88.07
EDGE ROAD
719+29.46
EDGE ROAD
719+37.88
EDGE ROAD
720+26.94
EDGE ROAD
720+86.15
EDGE ROAD
1,478.46'
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
OWNERSHIP: B.L.M.
STA.: 684+69.15 TO 720+76.29
DIST.: 3,607.14 LINEAR FT.
218.61 LINEAR RODS
AREA: 4.1538 ACRES
C.L. PROPOSED PIPELINE
25'X144' TUA
719+79.46
720+76.29
1,156.00'
N88°24'29"W 2,634.47'
S01°10'49"W 2,645.93'
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
REGISTERED PROFESSIONAL SURVEYOR
5/1/15
STATION AND BEARING TABLE
STATION
BEARING
DISTANCE
DEFLECTION
DIRECTION
42°27'15"
Left
10°40'39"
Left
27°15'59"
Left
04°51'39"
Left
02°20'41"
Right
00°04'39"
Right
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
TERRA
SCALE
0
500
1000
(IN FEET)
1 inch = 1000 ft.
SHEET 17 OF 18


WESTERN REFINING
10" CRUDE OIL PIPELINE RIGHT-OF-WAY EASEMENT
within
SECTION 7
T.22N., R.8W., N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
APRIL 2015
NOTES:
1. FIELD SURVEY PERFORMED OCTOBER 2014 THRU APRIL 2015.
2. ALL DISTANCES SHOWN ARE GROUND DISTANCES.
3. BEARINGS BEING STATE PLANE NAD 83 NM CENTRAL ZONE DERIVED FROM GPS OBSERVATIONS AND ADJUSTED UTILIZING NGS OPUS PROJECTS.
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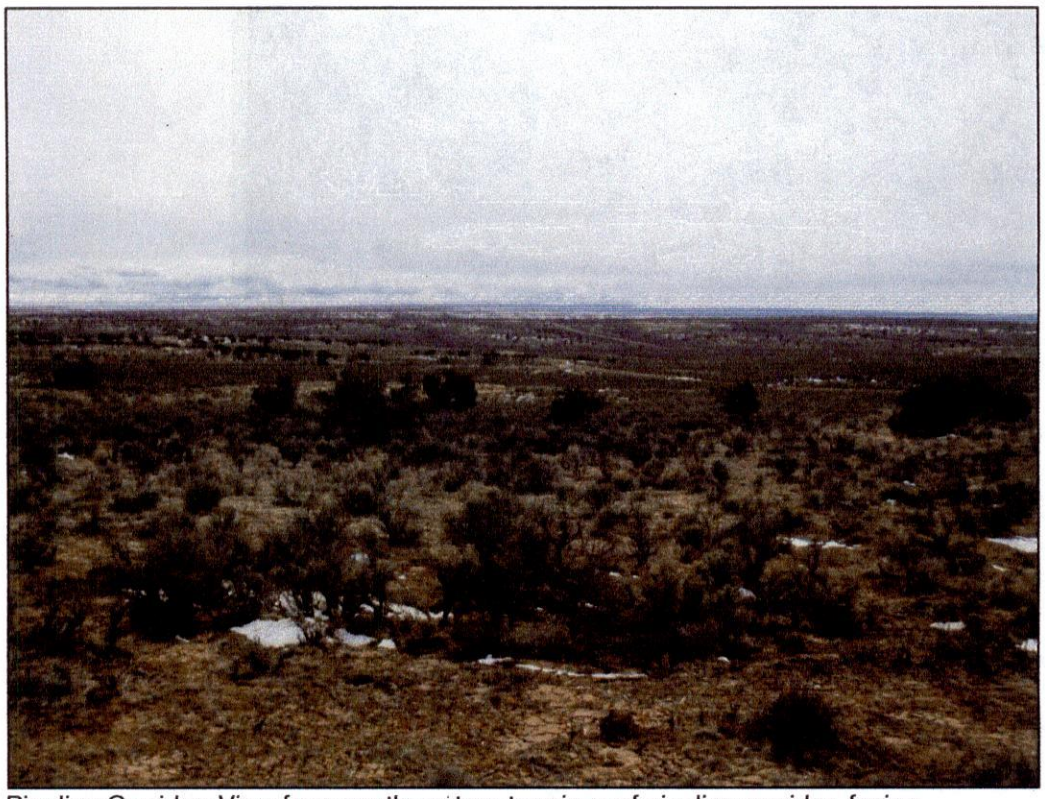
5. LOCATION & DEPTH OF UTILITIES NEED TO BE FIELD VERIFIED.
TYPICAL EASEMENT R/W DETAIL
35'
15'
50'
C.L. PROPOSED PIPELINE
FND. 1947 GLO BRASS CAP (1/4 CORNER)
S88°24'29"E 2,634.47'
1,156.00'
1,478.46'
25'X125' TUA
720+76.29
721+17.28
W.L. XING
731+40.03
732+45.79
EDGE ROAD
732+89.41
EDGE ROAD
733+38.79
734+03.03
EDGE ROAD
734+53.61
EDGE ROAD
734+70.31
737+22.00
C.L. PROPOSED PIPELINE
E.O.P.
OWNERSHIP: B.L.M.
STA.: 720+76.29 TO 737+22.00
DIST.: 1,645.71 LINEAR FT.
99.74 LINEAR RODS
AREA: 1.8805 ACRES
FND. 1947 GLO BRASS CAP (SEC. CORNER)
S01°10'55"W 2,643.50'
FND. 1947 GLO BRASS CAP (1/4 CORNER/BENT)
FND. 1947 GLO BRASS CAP (1/4 CORNER)
SECTION 7
N01°15'36"E 2,645.59'
S01°04'13"W 2,630.55'
FND. 1947 GLO BRASS CAP (SEC. CORNER)
FND. 1947 GLO BRASS CAP (SEC. CORNER)
CHRISTOPHER A. MEDINA
NEW MEXICO
15702
5/1/15
REGISTERED PROFESSIONAL SURVEYOR
STATIONING AND BEARING TABLE
STATION BEARING DISTANCE DEFLECTION DIRECTION
720+76.29
731+40.03 Right
733+38.79 Left
734+70.31 Right
737+22.00
I, Christopher A. Medina, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and minimum standards for surveying in New Mexico.
May 1, 2015
Christopher A. Medina, New Mexico Professional Surveyor No. 15702
Date
TERRA LAND SURVEYS, LLC
TERRA
SCALE
0 500 1000
(IN FEET)
1 inch = 1000 ft.
SHEET 18 OF 18

APPENDIX D. PHOTOGRAPHS



Pipeline Corridor: View from southwestern terminus of pipeline corridor, facing Southward

Pipeline Corridor: View from southwestern terminus of pipeline corridor, facing northward

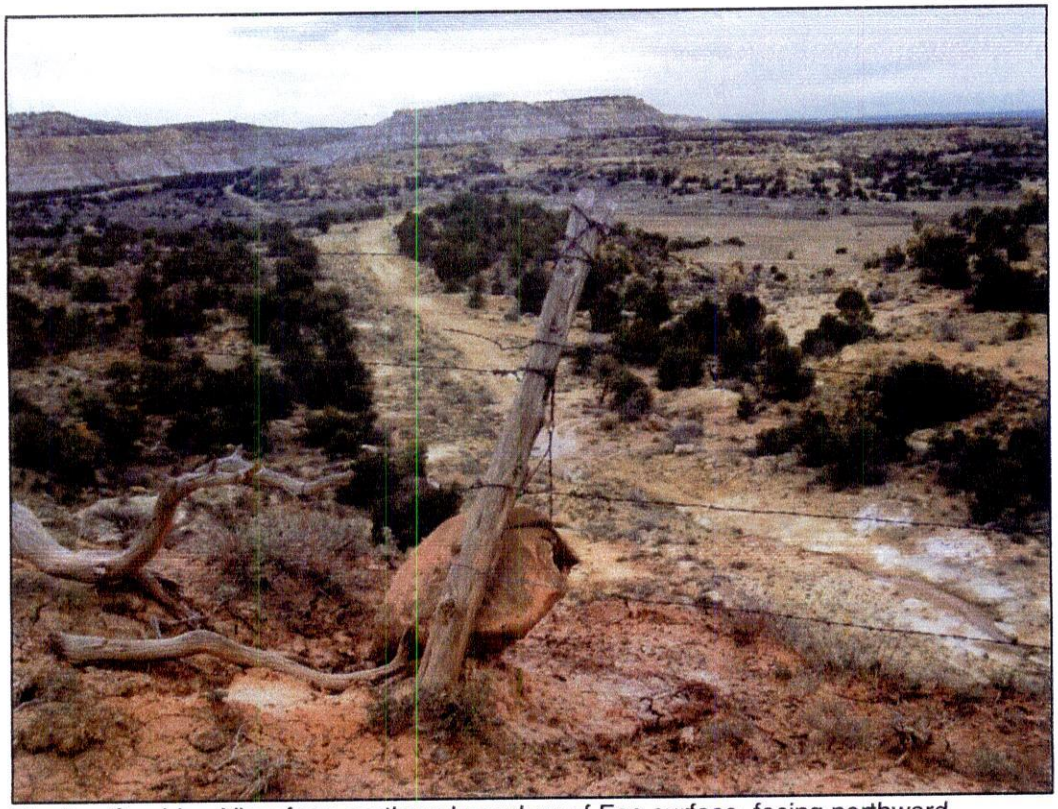
Pipeline Corridor and Chaco Road 7950: View from pipeline corridor toward Chaco Road 7950, facing northward

Pipeline Corridor: View from station 2355+61 of pipeline corridor, facing eastward

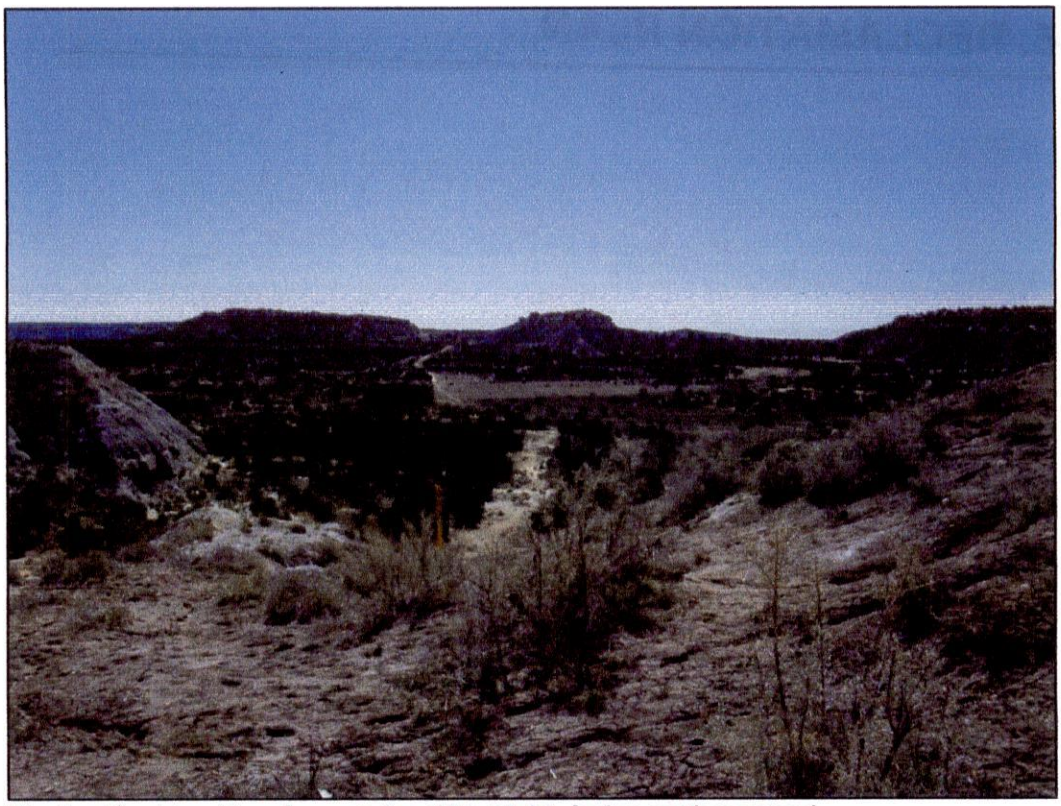
Pipeline Corridor: View from station 343+12.89 of pipeline corridor, facing eastward

Existing Road: View of piñon-juniper habitat and ponderosa pine trees avoided by the pipeline corridor, facing northwestward

Pipeline Corridor: View from station 193+26.47, facing northward



Pipeline Corridor: View from northern boundary of Fee surface, facing northward



Pipeline Corridor: View from station 105+59.39, facing northeastward

Pipeline Corridor: View from station 17+91.94, toward Western's Lybrook Storage Battery Station, facing northeastward.

APPENDIX E. RECLAMATION PLAN

Western Refining

Surface Reclamation Plan

Lybrook West Pipeline Project

June 2015

Western Refining
111 County Road 4990
Bloomfield, NM 87413
(505) 632-8006

Developed by:
Nelson Consulting, Inc.

835 East Second Avenue, Suite 250
Durango, Colorado 81301
970-375-9703

600 Reilly Avenue
Farmington, New Mexico 87401
505-327-6331

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   2.2 State of New Mexico Noxious Weeds 7
3. Surface Disturbace 7
   3.1 Pipeline Corridor 8
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Appendix A. Onsite Noxious Weed Form 15

1. INTRODUCTION

Western Refining (Western) is providing this Surface Reclamation Plan (Plan) to the Bureau of Land Management – Farmington Field Office (BLM-FFO) as part of their Plan of Development (POD) for the Lybrook West Pipeline project.

The project will include the construction of a pipeline corridor and seventeen temporary use areas (TUAs), fifteen of which are on BLM surface managed land. The pipeline corridor and the collective TUAs will be submitted under one ROW application resulting in two Right-of-Way (ROW) Grants; one ROW for the pipeline corridor and one ROW for the collective TUAs. Therefore the procedures described in Appendix B (ROW POD Procedure) of the BLM-FFO's Bare Soil Reclamation Procedures (Procedures; BLM 2013) will be followed for the project.

The project area is located on BLM-FFO-managed, State of New Mexico (State), and private (Fee)-managed surface. The Procedures and this Plan are not applicable for the portions of the project located on State- and Fee-surface. Therefore, the State- and Fee-portions of this project will not be discussed further in this Plan.

Pre-disturbance onsite meetings for the project were held with the BLM-FFO, the State, Western, and an environmental consultant (Nelson Consulting, Inc. [NCI]) on December 9, 2014 and March 18, 2015.

During reclamation, Western will follow the reclamation standards provided in this Plan to reestablish vegetation and control noxious weeds. The reclamation standards provided in this Plan are habitat-specific and meet standards established in *The Gold Book: Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (*The Gold Book;* BLM and U.S. Forest Service [USFS] 2007) and the Procedures (BLM 2013).

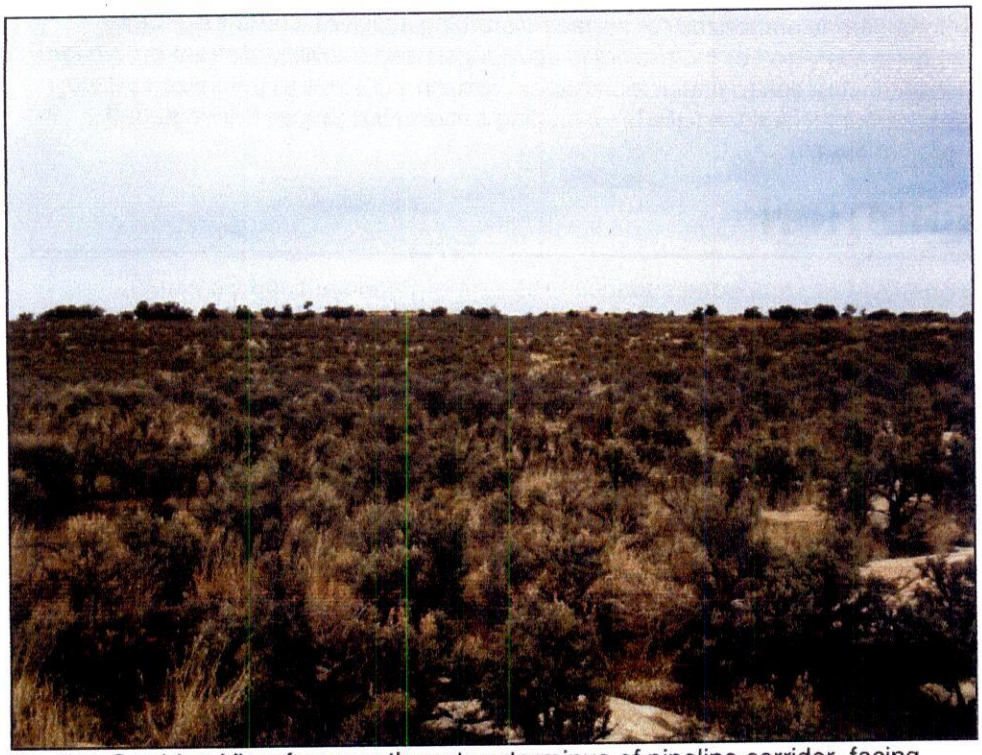
Western will be responsible for all areas authorized for surface-disturbing activities under the ROW Grants until the ROW Grants are transferred or the project is abandoned and a relinquishment is obtained from the BLM-FFO. From initial construction to final reclamation, Western will strive to minimize surface damage by utilizing Best Management Practices (BMPs), including maintaining proper drainage and controlling traffic within the project area.

2. SITE DESCRIPTION

The project area is located on BLM-FFO-managed surface in Rio Arriba, Sandoval, and San Juan Counties, New Mexico. The project area is also located on State and Fee-managed surface in Sandoval County.

Photographs of the pre-disturbance project area are provided below.

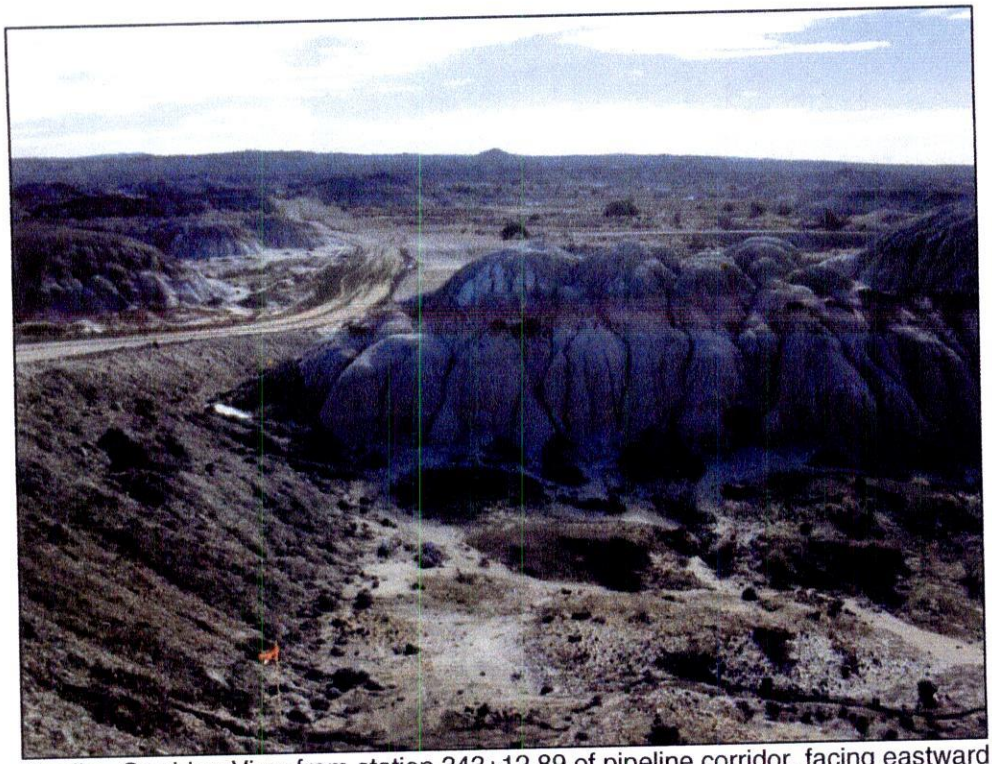
Pipeline Corridor: View from southwestern terminus of pipeline corridor, facing southward



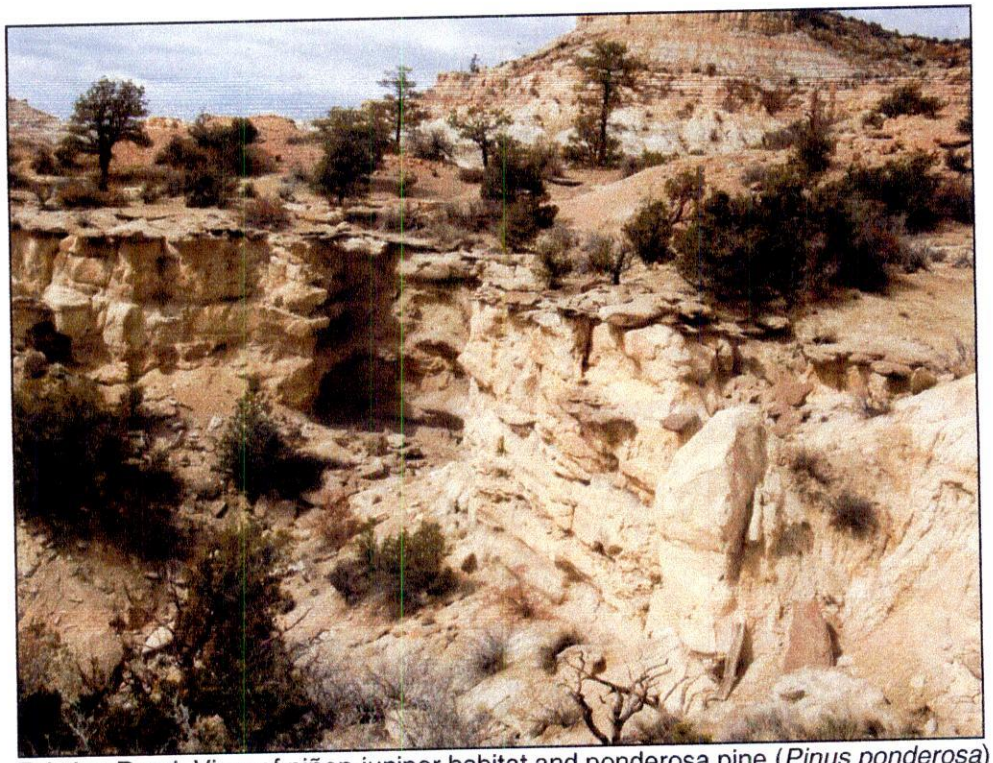
Pipeline Corridor: View from southwestern terminus of pipeline corridor, facing northward

Pipeline Corridor and Chaco Road 7950: View from pipeline corridor toward Chaco Road 7950, facing northward

Pipeline Corridor: View from station 2355+61 of pipeline corridor, facing eastward



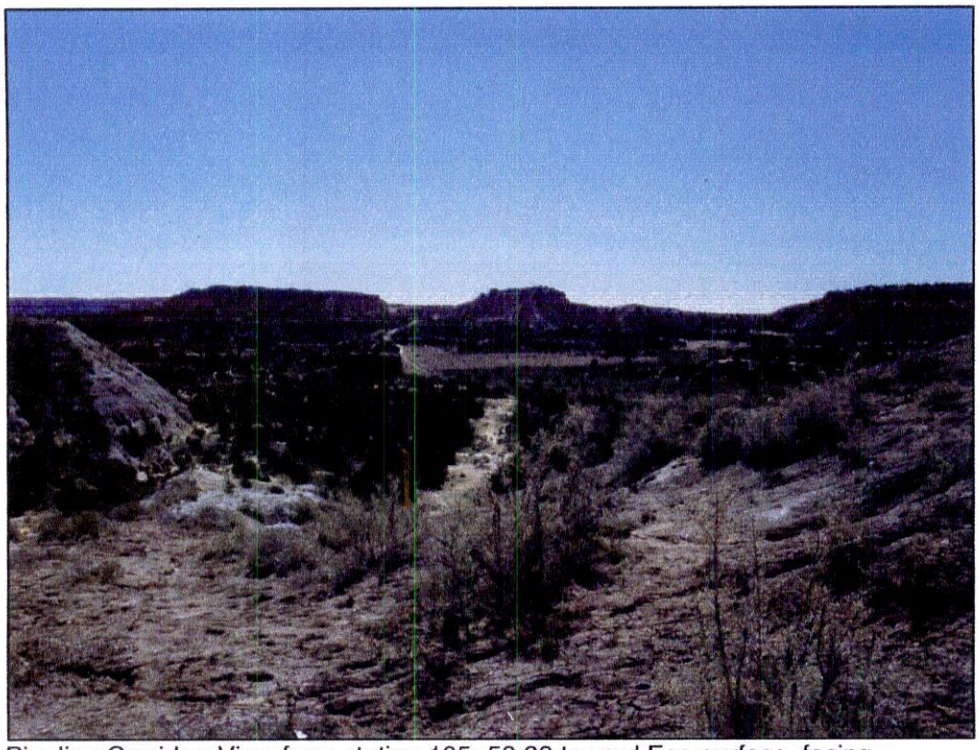
Pipeline Corridor: View from station 343+12.89 of pipeline corridor, facing eastward



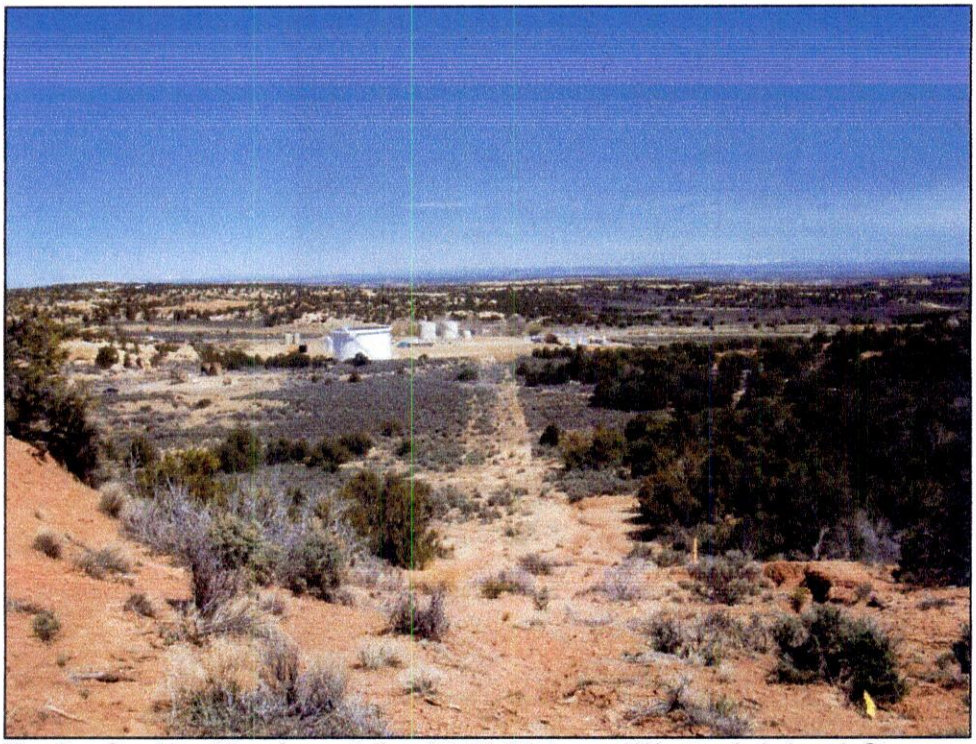
Existing Road: View of piñon-juniper habitat and ponderosa pine (*Pinus ponderosa*) trees avoided by the pipeline corridor, facing northwestward

Pipeline Corridor: View from station 193+26.47, facing northward

Pipeline Corridor: View from northern boundary of Fee-surface, facing northward



Pipeline Corridor: View from station 105+59.39 toward Fee-surface, facing south, southeastward



Pipeline Corridor: View from station 17+91.94, toward Western's Lybrook Storage Battery Station, facing northeastward

2.1 Vegetation Community

Of the eight most common BLM-FFO vegetation communities, it was determined during the pre-disturbance onsite meeting that three vegetation communities best represents the project area: Sagebrush/Grass, Piñon-Juniper, and Badland. Detailed descriptions of these vegetation communities are available on the New Mexico BLM web page (http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_planning/surface_use_plan_of.html).

2.2 State of New Mexico Noxious Weeds

A noxious weed survey of the project area was conducted by the BLM, Western, and NCI during the second pre-disturbance onsite meeting on March 18, 2015. The Onsite Noxious Weed Form was completed during the pre-disturbance onsite meeting and is attached to this Plan. One New Mexico Department of Agriculture Class B-listed species was identified within the project area. Halogeton (*Halogeton glomeratus*) was found along the south side of the Lybrook West pipeline near the middle of the pipeline corridor and there were approximately 1,000 individuals present.

3. SURFACE DISTURBANCE

The project will result in 88.6 acres of total surface disturbance, including BLM-FFO-, State-, and Fee-managed surface. Of this, 79.4 acres (including TUAs) will be constructed on BLM-FFO-managed surface and 58.2 acres will be considered new BLM-FFO-managed surface disturbance. The entire 58.2 acres will be fully reclaimed (re-seeded and re-contoured) during reclamation. All remaining portions of the project area will be reclaimed when the pipeline is finally abandoned. Project features are summarized in the below table and described in detail in the sub-sections below.

Table 1. Surface Disturbance Acreage – BLM Only

Feature	Acreage		Description of New Disturbance Acreage Following Reclamation
	Total	New Disturbance	Fully Reclaimed (Reseeded and Recontoured)
Pipeline Corridor	74.1	52.9	52.9
TUA 1	0.2	0.2	0.2
TUA 2	0.5	0.5	0.5
TUA 3	0.5	0.5	0.5
TUA 4	0.2	0.2	0.2
TUA 5	1.8	1.8	1.8
TUA 6	0.2	0.2	0.2
TUA 7	0.3	0.3	0.3
TUA 8	0.3	0.3	0.3
TUA 11	0.2	0.2	0.2
TUA 12	0.3	0.3	0..3
TUA 13	0.3	0.3	0.3
TUA 14	0.2	0.2	0.2
TUA 15	0.1	0.1	0.1
TUA 16	0.1	0.1	0.1
TUA 17	0.1	0.1	0.1
Total	**79.4**	**58.2**	**58.2**
*TUA nos. 9 & 10 are located on State-managed surface and will not be included in this table or the TUA list in Section 3.2 –TUAs on BLM.			

3.1 Pipeline Corridor- (includes BLM, State, & Fee)

The pipeline corridor will be 73,722 feet long and 50-foot-wide (approximately 88.6 acres). Of this, 64,591 feet (approximately 74.1 acres), not including TUAs, will be located on BLM-FFO managed surface. Of this, 61,802 feet (approximately 49.7 acres) will parallel existing disturbance. The remainders of the pipeline corridor, 2,789 feet (3.2 acres), from approximate stationing 198+90 to 171+01 will not parallel existing disturbance and will be considered all new surface disturbances. Therefore, new surface disturbance associated with the pipeline corridor on BLM-FFO managed surface will be 52.9 acres, excluding TUAs. All of this disturbance will be fully reclaimed during final reclamation.

3.2 TUAs on BLM

There will be 15 TUAs (approximately 5.3 acres total) associated with the pipeline corridor on BLM-managed surface. The TUA construction will involve the potential clearing of vegetation, but will remain minimal in nature. The TUAs will be fully reclaimed during interim reclamation and are described further below:

- TUA #1: 25 feet wide by 400 feet long (0.2 acre), used for wash crossing during construction, located at approximate stationing 3+15 to 7+15..
- TUA#2: 100 feet wide by 200 feet long (0.5 acre), used for vehicle turn-around during construction, located at approximate stationing 12+15 to 14+15.
- TUA #3: 100 feet wide by 200 feet long (0.5 acre), used for vehicle turn-around during construction, located at approximate stationing 21+15 to 23+15.
- TUA #4: 25 feet wide by 410 feet long (0.2 acre), used for side hill cut during construction, located at approximate stationing 51+16 to 55+26.
- TUA #5: 50 feet wide by 1,539 feet long (1.8 acres), used for side hill cut during construction, located at approximate stationing 173+61 to 189+00.
- TUA #6: 25 feet wide by 400 feet long (0.2 acre), used for wash crossing during construction, located at approximate stationing 237+00 to 241+00.
- TUA #7: 25 feet wide by 536 long (0.3 acre), used for side hill cut during construction, located at approximate stationing 256+03 to 261+39.
- TUA #8: 25 feet wide by 569 feet long (0.3 acre), used for side hill cut during construction, located at approximate stationing 282+84 to 288+53.
- TUA #11: 25 feet wide by 300 feet long (0.2 acres), used for side hill cut during construction, located at approximate stationing 517+13 to 520+13.
- TUA #12: 75 feet wide by 200 feet long (0.3 acre), used to directionally drill under San Juan County Road 7900, located at approximate stationing 564+14 to 566+14.
- TUA #13: 75 feet wide by 200 feet long (0.3 acre), used to directionally drill under San Juan County Road 7900, located at approximate stationing 567+64 of off ROW of the proposed pipeline corridor.
- TUA #14: 75 feet wide by 125 feet long (0.2 acre), used to directionally drill under San Juan County Road 7950, located at approximate stationing 642+73 to off ROW of the proposed pipeline corridor.
- TUA #15: 25 feet wide by 125 feet long (0.1 acre), used to directionally drill under San Juan County Road 7950, located at approximate stationing 644+00 to 645+25.
- TUA #16: 25 feet wide by 144 feet long (0.1 acre), for directional drill under San Juan County Road 7950, located at approximate stationing 718+31 to 719+76.
- TUA #17: 25 feet wide by 125 feet long (0.1 acre), used to directionally drill under San Juan County Road 7950, located at approximate stationing 721+00 to 722+25.

4. REVISION OF THE RECLAMATION PLAN

In accordance with guidelines described on page 44 of *The Gold Book* (BLM and USFS 2007), Western may submit a revision request (with justification) to the BLM-FFO to revise this Plan at any time during the life of the project.

5. RECLAMATION

Vegetation Reclamation Procedure B will apply to this project. Vegetation Procedure B is described further in the BLM-FFO's Procedures (BLM 2013). These reclamation procedures will apply to BLM-FFO portions of the project area.

5.1 Seed Mixture

During the pre-disturbance onsite meeting, plant species were chosen from the BLM-FFO's Sagebrush/Grass, Piñon-Juniper, and Badland Vegetation Community Seed List; these species will be used in the revegetation seed mixture. The plant species picked for reclamation are provided in the table below.

Table 2. Sagebrush/Grass Seed Mixture

Common Name	Scientific Name	Pure Live Seed (Pounds/Acre*)
Fourwing saltbush	*Atriplex canescens*	2.00
Winterfat	*Krascheninnikovia lanata*	2.00
Indian ricegrass	*Achnatherum hymenoides*	4.00
Blue grama	*Bouteloua gracilis*	2.00
Sand dropseed	*Sporobolus cryptandrus*	0.50
Bottlebrush squirreltail	*Elymus elymoides*	3.00
Small burnet	*Sanguisorba minor*	2.00
Lewis flax	*Linum lewisii*	0.25
* Minimum; Based on 60 pure live seeds per square foot, if drill seeded. This rate will be doubled (120 pure live seeds per square foot) if broadcasted or hydroseeded.		

Table 3. Piñon-Juniper Seed Mixture

Common Name	Scientific Name	Pure Live Seed (Pounds/Acre*)
Antelope bitterbrush	*Purshia tridentata*	2.00
Western wheatgrass	*Pascopyrum smithii*	2.00
Needleandthread	*Hesperostipa comata*	3.00
Indian ricegrass	*Achnatherum hymenoides*	3.50
Blue grama	*Bouteloua gracilis*	2.00
Sand dropseed	*Sporobolus cryptandrus*	0.50
Scarlet globemallow	*Sphaeralcea coccinea*	0.25
* Minimum; Based on 60 pure live seeds per square foot, if drill seeded. This rate will be doubled (120 pure live seeds per square foot) if broadcasted or hydroseeded.		

Table 4. Badland Vegetation Community Seed Mixture

Common Name	Scientific Name	Pure Live Seed (Pounds/Acre*)
Fourwing saltbush	*Atriplex canescens*	4.00
Winterfat	*Krascheninnikovia lanata*	2.00
Indian ricegrass	*Achnatherum hymenoides*	5.00

Common Name	Scientific Name	Pure Live Seed (Pounds/Acre*)
Alkali sacaton	*Sporobolus airoides*	0.25
Blue gramma	*Bouteloua gracilis*	0.50
Bottlebrush squirreltail	*Linum lewisii*	4.00
Small flower globemallow	*Sphaeralcea*	0.25
* Minimum; Based on 60 pure live seeds per square foot, if drill seeded. This rate will be doubled (120 pure live seeds per square foot) if broadcasted or hydroseeded.		

5.2 Construction Techniques

Vegetation removed during construction, including trees that measure less than 3 inches in diameter (at ground level) and slash/brush, will be chipped or mulched and incorporated into the topsoil as additional organic matter. If trees are present, trees 3 inches in diameter or greater (at ground level) will be cut to ground level and de-limbed. Tree trunks (left whole) and cut limbs will be stacked. The subsurface portion of trees (tree stumps) will be placed in adjacent areas needing soil stabilization, or hauled to an approved disposal facility.

Following the removal of vegetation, the top 6 inches of topsoil will be stripped. The topsoil will be stored separately from subsoil or other excavated material within the construction zone. The topsoil will be free of brush. Surface rocks, if present and where useful for reclamation, will be stockpiled adjacent to the topsoil stockpile. Vehicle/equipment traffic will not be allowed to cross topsoil stockpiles.

If topsoil is stored for a length of time such that nutrients are depleted from the topsoil, amendments will be added to the topsoil as advised by the Western environmental scientist or appropriate agent/contractor.

5.2.1 Road Upgrade and TUAs

Topsoil will be stored separately from subsoil material or other excavated material.

5.2.2 Pipeline Corridor

The topsoil will not be used for padding the pipe and will not be mixed with excavated subsoil. The excavated subsoil will be stockpiled separately from the topsoil along the edge of the pipeline corridor. Gaps will be made in topsoil and subsoil stockpiles, where necessary, to avoid ponding or to divert water during storm events.

5.3 Reclamation Techniques

Under a ROW Grant, the BLM-FFO does not make a distinction between interim and final revegetation reclamation processes. The revegetation processes and standards described in this Plan are the same for all revegetation reclamation activities.

5.3.1 Notification

The BLM-FFO will be notified (505-564-7600) at least 48 hours prior to the start of reclamation activities.

5.3.2 Recontouring

Within areas that require recontouring, the surface will be recontoured to match pre-disturbance conditions or to blend with the surrounding landform as closely as possible.

5.3.3 Soil Preparation & Reseeding

Within areas that will be reseeded, stockpiled topsoil will be evenly redistributed prior to final seedbed preparation. Topsoil will not be redistributed when the ground or topsoil is frozen or wet.

Western will properly prepare the seedbed to meet the standards for reclamation identified in the Procedures (BLM 2013).

The reseed areas will be seeded with plant species from the seed mixture described in Section 5.1 (Seed Mixture). A disc-type seed drill with two boxes for various seed sizes will be utilized for seeding the reclamation area. The drill rows will be 8.00 to 10.00 inches apart. Where practicable with the seeding equipment being used, planting depths for small seeds will be 0.25 inch, for intermediate seeds will be 0.50 inch, and for large seeds will be 1.00 to 2.00 inches. Where the aforementioned depths are impracticable with the seeding equipment being used, planting depths will be no more than 0.25 inch. A drag, packer, or roller will follow the seeder to ensure uniform seed coverage and adequate compaction. Seeding will be run perpendicular to slopes in order to minimize runoff and erosion. In areas where the slope is too steep for a seed drill, hand- or broadcast-seeding methods will be utilized, and the seeds will be covered to the depths described above. The establishment of vegetation will assist in stabilizing the soil and minimizing erosion within the project area.

Surface disturbance areas will be recontoured and soils will be separated by color to match pre-disturbance conditions or to blend with the surrounding landform, as close as possible.

5.3.4 Additional Erosion Control

Erosion control associated with topsoil stockpiles is discussed in Section 5.2 (Construction Techniques).

During reclamation, stockpiled rocks, if available, will be placed within the reclamation area for erosion control and/or to discourage off-highway vehicle traffic (if requested by the BLM-FFO), and/or in a manner that visually blends with the adjacent, undisturbed landscape.

Along the pipeline corridor, waterbars may be constructed (if specified by the BLM-FFO authorized officer). If waterbars are required, they will follow the horizontal contour of the hillslope on which they are placed. The spacing requirements by hillslope grade are provided in the table below.

Table 3. Waterbar Spacing Requirements by Percent Grade of Hillslope

Hillslope Percent Grade (%)	Waterbar Spacing (feet)
Less than 1	400
1-5	300
5-15	200
15-25	100

During the March 18, 2015 pre-disturbance onsite meeting, it was decided the placement of other water- and erosion-control features within the project area will be determined during reclamation. Erosion-control features will be applied as specified by the authorized BLM-FFO officer.

These water-management measures will reduce soil erosion caused by stormwater runoff and assist with revegetation success.

5.4 Challenges

Soil erosion can impact reclamation success. Topsoil mitigation and erosion-control measures are discussed in Sections 5.2 (Construction Techniques), 5.3.4 (Reclamation Techniques – Additional Erosion Control).

According to the Natural Resources Conservation Service (2008 and 2009) there are ten soil types within the project area and TUAs. These soil types are described below:

Rio Arriba County:

- Privaetes-Florita complex (2- to 10-percent slopes): very high potential for wind erosion, low runoff classification. Approximately 0.3 mile of pipeline corridor will cross this soil type.

- Vessilla-Menefee-Orlie complex (1- to 30- percent slopes): low to high potential for wind erosion, medium to high runoff classification. Approximately 0.6 mile of pipeline corridor will cross this soil type.

Sandoval County:

- Badland: moderate potential for wind erosion, low to moderate runoff classification, and is classified as fragile by the BLM-FFO. The BLM-FFO has developed procedures for reclamation and stabilization of fragile soils. Fragile soils are defined as having a high erosion risk due to a combination of soil erodibility characteristics, slope length, and slope gradient; and may be difficult to stabilize and reestablish vegetation (BLM 2014). Approximately 3.8 miles of pipeline corridor will cross this soil type.

- Blancot-Councelor-Tsosie association (0- to 5-percent slopes): very high potential for wind erosion, moderate runoff classification. Approximately 0.9 mile of pipeline corridor will cross this soil type.

- Rock outcrop-Vessilla-Menefee complex (15- to 45-percent slopes): moderate to high potential for wind erosion, high to very high runoff classification, and is classified as fragile by the BLM-FFO. The BLM-FFO has developed procedures for reclamation and stabilization of fragile soils. Fragile soils are defined as having a high erosion risk due to a combination of soil erodibility characteristics, slope length, and slope gradient; and may be difficult to stabilize and reestablish vegetation (BLM 2014). Approximately 0.7 mile of pipeline corridor will cross this soil type.

- Vessilla-Menefee-Orlie association (0- to 33- percent slopes): very high potential for wind erosion, high runoff classification. Approximately 1.1 miles of pipeline corridor will cross this soil type.

San Juan County:

- Badland: moderate potential for wind erosion, low to moderate runoff classification, and is classified as fragile by the BLM-FFO. The BLM-FFO has developed procedures for reclamation and stabilization of fragile soils. Fragile soils are defined as having a high erosion risk due to a combination of soil erodibility characteristics, slope length, and slope gradient; and may be difficult to stabilize and reestablish vegetation (BLM 2014). Approximately 0.4 mile of pipeline corridor will cross this soil type.

- Blancot-Notal association (gently sloping): moderate potential for wind erosion, moderate to high runoff classification. Approximately 0.6 mile of pipeline corridor will cross this soil type.

- Doak-Sheppard-Shiprock association (rolling): low to moderate potential for wind erosion, low to moderate runoff classification. Approximately 2.8 miles of pipeline corridor will cross this soil type.

- Fruitland-Persayo-Sheppard complex (hilly slopes): low to moderate potential for wind erosion, moderate to high runoff classification. Approximately 2.6 miles of pipeline corridor will cross this soil type.

6. MONITORING, REPORTING, & ATTAINMENT

Reclamation monitoring is required to document attainment of the vegetation percent cover standard (and therefore, reclamation success). Monitoring, reporting, and attainment will apply to BLM-FFO portions of the project area.

6.1 Initial Monitoring & Reporting

Monitoring sites will be established by the BLM-FFO, in collaboration with Western, during the required earthwork and/or seeding inspection. Initial monitoring tasks will be conducted by the BLM-FFO. The BLM-FFO will submit the initial monitoring report to the operator within 60 days of conducting the initial monitoring tasks.

6.2 Annual Monitoring & Reporting

Annual monitoring by the BLM-FFO will begin two calendar years after BLM-FFO approval of required earthwork and/or seeding, and will continue until the vegetation percent cover standard has been attained or a FAN or exception has been issued by the BLM-FFO. Annual monitoring reports will be made available to the operator within 60 days of monitoring.

6.3 Reclamation Attainment

The following vegetation percent cover standard must be attained for reclamation to be considered successful for the following vegetation communities:

Sagebrush/Grass Vegetation Community:

- Non-invasive/desirable plant species: Greater than or equal to 35%
- Invasive/undesirable plant species: Less than or equal to 10%

Piñon-Juniper Vegetation Community:

- Non-invasive/desirable plant species: Greater than or equal to 20%
- Invasive/undesirable plant species: Less than or equal to 10%

Badland Vegetation Community:

- Non-invasive/desirable plant species: Greater than or equal to 20%
- Invasive/undesirable plant species: Less than or equal to 10%

Once monitoring results indicate that the project area has reached attainment, the BLM-FFO will prepare documentation of this attainment.

If, following the reclamation process, a reclaimed area has not met the vegetation percent cover standard, a conference will be held with Western, the BLM-FFO, and any other effected parties to analyze the issues affecting reclamation success. This process (including reclamation exception requests) is outlined in the Procedures (BLM 2013).

6.1.3 Long-Term Monitoring

Once the vegetation percent cover standard has been attained, the BLM-FFO will conduct long-term monitoring every five years until the permits are transferred or final reclamation takes place.

7. REFERENCES

Bureau of Land Management (BLM). 2013. Farmington Field Office Bare Soil Reclamation Procedures. Available at: http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_planning/surface_use_plan_of.html.

_____. 2014. Fragile Soils Procedure. Farmington, New Mexico: BLM-FFO.

Bureau of Land Management (BLM) and U.S. Forest Service (USFS). 2007. The Gold Book: Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development – 4th Edition, revised in 2007.

Natural Resources Conservation Service (NRCS). 2008. Soil Survey of Rio Arriba Area, New Mexico: Parts of Rio Arriba and Sandoval Counties. Web Soil Survey. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Natural Resources Conservation Service. 2009. Soil Survey of San Juan County, New Mexico: Eastern Part. Web Soil Survey. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

APPENDIX A. ONSITE NOXIOUS WEED FORM

Onsite Noxious Weed Form

If noxious weeds are found during the onsite, fill out form and submit to FFO weed coordinator
Operator Kelly Robinson Surveyor(s) Scott Hall, S. Griffin, J. Leonhart
Well Name and Number [illegible] Date 03-18-2015
Location: Township, Range, Section [illegible] - T22N R7W Sec. 22, 23.
Location of Project NAD 83 Decimal Degrees 36.175333, -107.658344

Class A Noxious Weed – Check Box if Found

	Alfombrilla		Diffuse knapweed		Hydrilla		Purple starthistle		Yellow toadflax
	Black henbane		Dyer's woad		Leafy spurge		Ravenna grass		
	Camelthorn		Eurasian watermilfoil		Oxeye daise		Scotch thistle		
	Canada thistle		Giant salvinia		Parrotfeather		Spotted knapweed		
	Dalmation toadflax		Hoary cress		Purple loosestrife		Yellow starthistle		

Class B Noxious Weed – Check Box if Found

	African rue		Perennial pepperweed		Russian knapweed		Tree of heaven
	Chicory		Musk thistle		Poison hemlock		
	Halogeton		Malta starthistle		Teasel		

Comments:
Russian thistle along fence line at private property

Halogeton

FFO Representative: Scott Hall 3/18/15
sign and date
Operator Representative Kelly Robinson 3-18-15
sign and date

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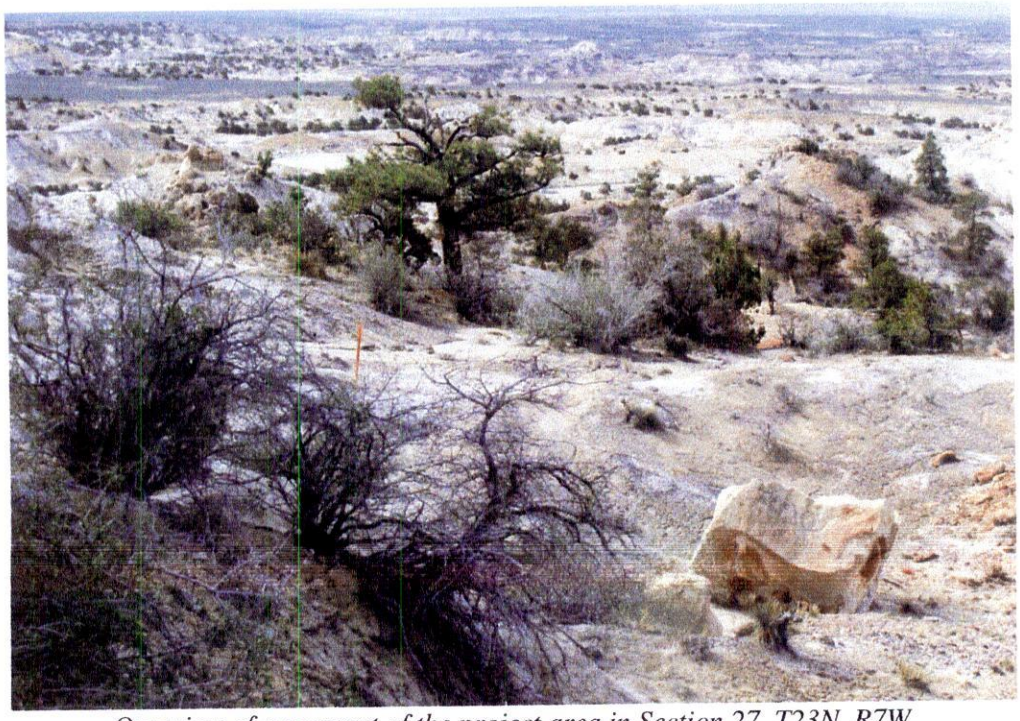
APPENDIX F. PALEONTOLOGICAL REPORT

A Paleontological Resource Survey for the Western Refining Lybrook West Pipeline - 10 Inch Crude Oil Pipeline Alignment.
Sections 27, 32, 33, and 34, T23N, R7W,
Section 5, T22N, R8W
Sandoval County and San Juan County, New Mexico;

For Bureau of Land
Management-Farmington Field Office (BLM/FFO)



Overview of a segment of the project area in Section 27, T23N, R7W.

Prepared by:
John Burris, Ph.D.
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BLM Permit Number: NM 13-03 C

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617 Teton Drive
Farmington, NM 87401
BLM Permit Number: NM 13-04 C

Under Contract For:
Nelson Consulting, Inc.
835 E 2nd Ave, Ste 250
Durango, CO 81301

May 8, 2015

Introduction

Western Refining is proposing the Lybrook West 10 Inch Crude Oil Pipeline Alignment project on federal land with the mineral resources administered by the BLM Farmington Field Office (FFO) and on State of New Mexico lands. Early Paleogene Nacimiento Formation and San Jose Formation outcrops designated as Class 5 in the Potential Fossil Yield Classification System (PFYC) occur in the area. A paleontology survey was required by the Bureau of Land Management/Farmington Field Office (BLM/FFO). The Nacimiento Formation has produced important vertebrate, invertebrate, and plant fossils (Williamson, 1996; Williamson and Lucas, 1992; Tsentas, 1981; Matthew, 1937), as has the San Jose Formation (Lucas, 1977).

Location

Legal coordinates of the proposed pipeline surveyed for paleontological resources are within Sections 27, 32, 33, 34, Township 23 North, Range 7 West in Sandoval County, and Section 5, Township 22 North, Range 8 West in San Juan County.

1. Start Station 173+61
   Stop Station 189+00

   Sandoval County (BLM/FFO)
   Start of survey: S½, SE¼, Sec 27, T23N, R7W
   End of survey: NW¼, NE¼, Sec 34, T23N, R7W
   Surveyed 85lf wide, west side of stakes.
   Surveyed 15lf wide, east side of stakes.

2. Start Station 256+03
   Stop Station 261+00

   Sandoval County (BLM/FFO)
   NW¼, SE¼, Sec 33, T23N, R7W
   Surveyed 60lf wide, north side of stakes.
   Surveyed 15lf wide, south side of stakes.

3. Start Station 282+84
   Stop Station 288+13

   Sandoval County (BLM/FFO)
   SW¼, SW¼, Sec 33, T23N, R7W
   Surveyed 60lf wide, south side of stakes.
   Surveyed 15lf wide, north side of stakes.

4. Start Station 298+13
   Stop Station 316+13

   Sandoval County (State of New Mexico)
   Start of survey: SE¼, SE¼, Sec 32, T23N, R7W
   End of survey: SW¼, SE¼, Sec 32, T23N, R7W
   Surveyed 60lf wide, south side of stakes.
   Surveyed 15lf wide, north side of stakes.

5. Start Station 663+19
   Stop Station 683+67

   San Juan County (BLM/FFO)
   Start of survey: SE¼, NW¼, Sec 5, T22N, R8W
   End of survey: SW¼, NW¼, Sec 5, T22N, R8W
   Surveyed 35lf wide, north side of stakes.
   Surveyed 15lf wide, south side of stakes.

Geology

The San Jose Formation is composed of fine-grained, well-sorted, sub-rounded, cross-bedded quartz sandstone with calcite and hematite cements (**Figure 1**). Some of the sandstone is very friable, in other exposures the sandstone is well-cemented. Some iron oxide concretions exist in the sandstone. Tan, gray, and orange mudrocks are also abundant in the San Jose Formation (**Figure 2**). The bedrock is covered with a soil layer and sagebrush at the northernmost portion of the proposed pipeline surveyed on top of a mesa, and outcrops are exposed along an escarpment to the south. San Jose Formation outcrops were examined in Section 27, T23N, R7W.

The remainder of the outcrops surveyed for paleontological resources were from the Nacimiento Formation. The Nacimiento Formation is exposed in badlands topography and along escarpments (**Figure 3**). Most of the outcrops consist of mudrock with some interbedding with lithic sandstone. The mudrock ranges in color, including white, gray, and black (carbonaceous) (**Figures 4, 5**). The mudrock varies between laminated bedding and massive bedding. Hematite and calcite cemented quartz sandstone is common throughout the project area (**Figure 6**). Permineralized wood is common along in these outcrops, as are iron-oxide concretions (**Figure 7**). Barite nodules and gypsum crystals are common in the mudrocks.

Portions of the project area follows existing disturbance or access roads, and has experienced variable impact from this previous activity (**Figures 8, 9**).

Paleontological Monitoring Methodology

Ken Heil, Paleontologist under contract by Nelson Consulting, Inc., prospected the proposed pipeline on foot on April 13, 2015. All undisturbed outcrops were examined closely for paleontological resources.

After a database search of the New Mexico Museum of Natural History and Science locality catalog returned several localities in the vicinity, it was determined screenwashing for microfossils was necessary. Ken Heil and John Burris collected matrix for washing from the following locations:

1. NW ¼, NE ¼, Sect 34, T23N, R7W
   13S 269886m E, 4007908m N
   6975 feet elevation
   Sandoval County

2. NW ¼, SE ¼, Sec 33, T23N, R7W
   13S 268278m E, 4007117m N
   6893 feet elevation
   Sandoval County

3. NW ¼, SE ¼, Sec 33, T23N, R7W
   13S 268205m E, 4007138m N
   6889 feet elevation
   Sandoval County

4. SW ¼, SW ¼, Sec 33, T23N, R7W
   13S 267488m E, 4006936m N
   6883 feet elevation
   Sandoval County

5. SW ¼, SW ¼, Sec 33, T23N, R7W
   13S 267443m E, 4006922m N
   6906 feet elevation
   Sandoval County

6. SE ¼, SE ¼, Sec 32, T23N, R7W
   13S 266976m E, 4006971m N
   6950 feet elevation
   Sandoval County

7. SW ¼, SE ¼, Sec 32, T23N, R7W
   13S 266777m E, 4006978m N
   6908 feet elevation
   Sandoval County

8. SW ¼, SE ¼, Sec 32, T23N, R7W
   13S 266578m E, 4006985m N
   6887 feet elevation
   Sandoval County

9. SE ¼, NW ¼, Sec5, T22N, R8W
   13S 256476m E, 4006129m N
   6760 feet elevation
   San Juan County

Matrix was soaked in water for 20 hours, and then washed through a course screen (10 mesh) and fine screen (30 mesh). Concentrate was dried and transferred to trays. Concentrate was then examined for microfossils using a dissecting microscope.

A GPS unit and digital camera were used to record the survey.

Paleontological Survey Results – Positive Report
The paleontological survey yielded a positive report. Three new localities were discovered. Examination of the matrix yielded no microfossils.

1. Field locality #: JHB 1501
   Location: 13S 268205m E, 40007133m N, NAD 83
   NW ¼, SE ¼, NW ¼, SE ¼, Section 33, T23N, R7W
   Elevation 6894 feet
   Formation: Nacimiento Formation
   Fossils discovered: (**Figure 10**)
   Turtle carapace
   Comments: The fossil is an *in-situ* turtle carapace, with only the top of the shell exposed on the surface. The remainder of the carapace was excavated from gray-orange mudrock.

2. Field locality #: JHB 1502
   Location: 13S 268205m E, 40007133m N, NAD 83
   NW ¼, NE ¼, SW ¼, SW ¼, Section 33, T23N, R7W
   Elevation 6909 feet
   Formation: Nacimiento Formation
   Fossils discovered: (**Figure 11**)
   Crocodile scutes and unidentifiable bone fragments
   Comments: The fossils were found weathering as float on the surface of gray mudrock. The source of the fossils could not be determined.

3. Field locality #: JHB 1503
   Location: 13S 268205m E, 40007133m N, NAD 83
   NE ¼, NE ¼, SW ¼, SE ¼, Section 32, T23N, R7W
   Elevation 6894 feet
   Formation: Nacimiento Formation
   Fossils discovered: (**Figure 12**)
   Bone fragments
   Comments: The fossils were found weathering as float on the surface of gray mudrock. The source of the fossils could not be determined.

The proposed project area crosses PFYC Class 5a:

> "***Class 5*** – **Very High**. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation."
>
> "***Class 5a*** – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities. "

A database search of the New Mexico Museum of Nature and Science yielded 44 Nacimiento Formation localities within a mile of the project area. Due to these existing fossil localities and the three new Nacimiento Formation localities discovered during paleontological field surveying, monitoring by a paleontologist during surface disturbance of Nacimiento Formation is

recommended. Monitoring is specifically recommended for the project area surveyed in Section 27, 32, 33, and 34 of T23N, R7W. Monitoring is not necessary in Section 5, T22N, R8W, where no new localities were found, and no previously existing localities are known within 1 mile of the project area. Where the project crosses San Jose Formation in Section 27, T23N, R7W, monitoring is not necessary due to the lack of known fossil localities in the area.

Additionally, the turtle carapace at Field Locality JHB 1501 must be collected by a qualified paleontologist prior to surface disturbance.

During excavation or disturbance, vertebrate fossils may be uncovered, at which point excavation or disturbance in a 50 foot radius of the discovery should halt until the BLM-permitted paleontologist can examine the specimen to determine the appropriate next steps. The operator may then be allowed to continue excavation through the site, or will be given the choice of either (1) following the BLM-permitted paleontologist's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (2) following the BLM-permitted paleontologist's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area, which may include halting excavation in the vicinity until the specimen can be safely collected by a BLM-permitted paleontologist.

References Cited

Matthew, W. D., 1937, Paleocene Faunas of the San Juan Basin, New Mexico; Transactions of the American Philosophical Society, volume 30, 510p.

Tsentas, C., 1981, Mammalian biostratigraphy of the Middle Paleocene (Torrejonian) strata of the San Juan Basin: Notes on Torreon Wash and the status of *Pantolambda* and *Deltatherium* faunal "zones"; *in* Lucas, Rigby, Kues, eds., Advances in San Juan Basin Paleontology, University of New Mexico Press, p. 264 – 292.

Lucas, S. G., 1977, Vertebrate Paleontology of the San Jose Formation, East-Central San Juan Basin, New Mexico, *in* New Mexico Geological Society 28th Field Conference, San Juan Basin III, p. 221-226.

Williamson, T. E. 1996. The Beginning of the Age of Mammals in the San Juan Basin, New Mexico: Biostratigraphy and Evolution of Paleocene Mammals of the Nacimiento Formation., New Mexico Museum of Natural History and Science, Bulletin 8, 141 pages.

Williamson, T. E., and Lucas, S. G., 1992, Stratigraphy and mammalian biostratigraphy of the Paleocene Nacimiento Formation, Southern San Juan Basin, New Mexico; New Mexico Geological Society Guidebook, 43rd Field Conference, San Juan Basin IV, p. 265 – 296.

Figures

Figure 1: San Jose Formation sandstones exposed along margin of a mesa. Nacimiento Formation mudrocks are exposed in the badlands in the distance. View is to the south.

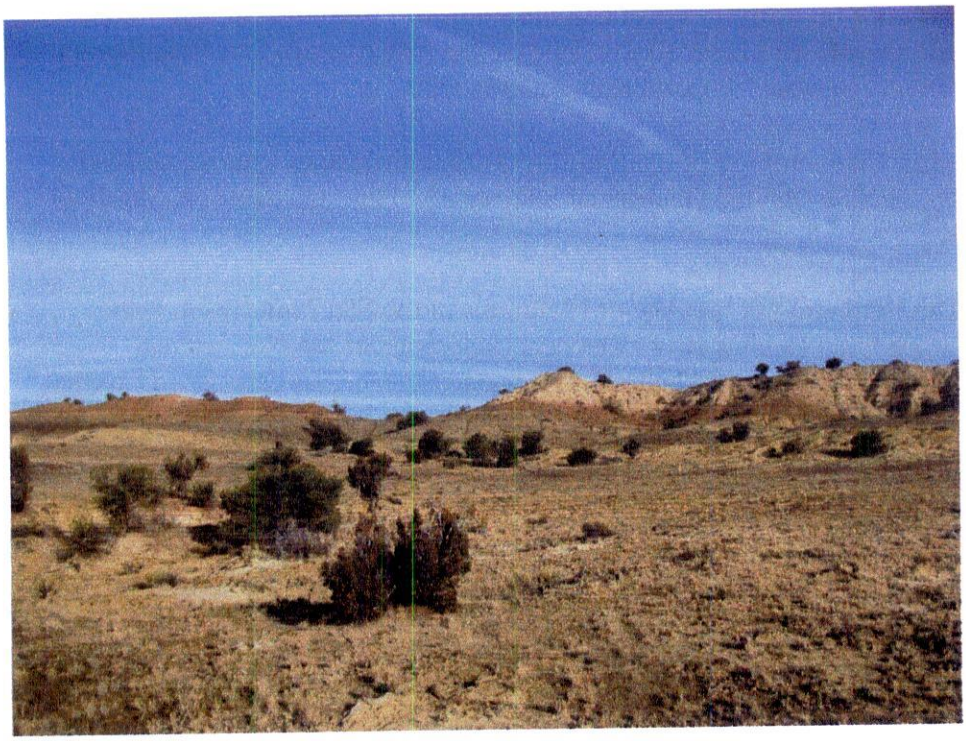

Figure 2: Tan, orange, and gray mudrocks of the San Jose Formation. View is to the south.

Figure 3: Outcrops of the Nacimiento Formation exposed in badlands topography. View is to the south.

Figure 4: Laminated carbonaceous mudrock of the Nacimiento Formation. View is to the south.

Figure 5: Light gray, massive mudrocks of the Nacimiento Formation. View is to the south.

Figure 6: Gray mudrocks and hematite-cemented sandstone of the Nacimiento Formation. View is to the north.

Figure 7: Iron-oxide concretions exposed by differential weathering of the mudrock. View is to the west.

Figure 8: Existing access road adjacent to right-of-way. View is to the west.

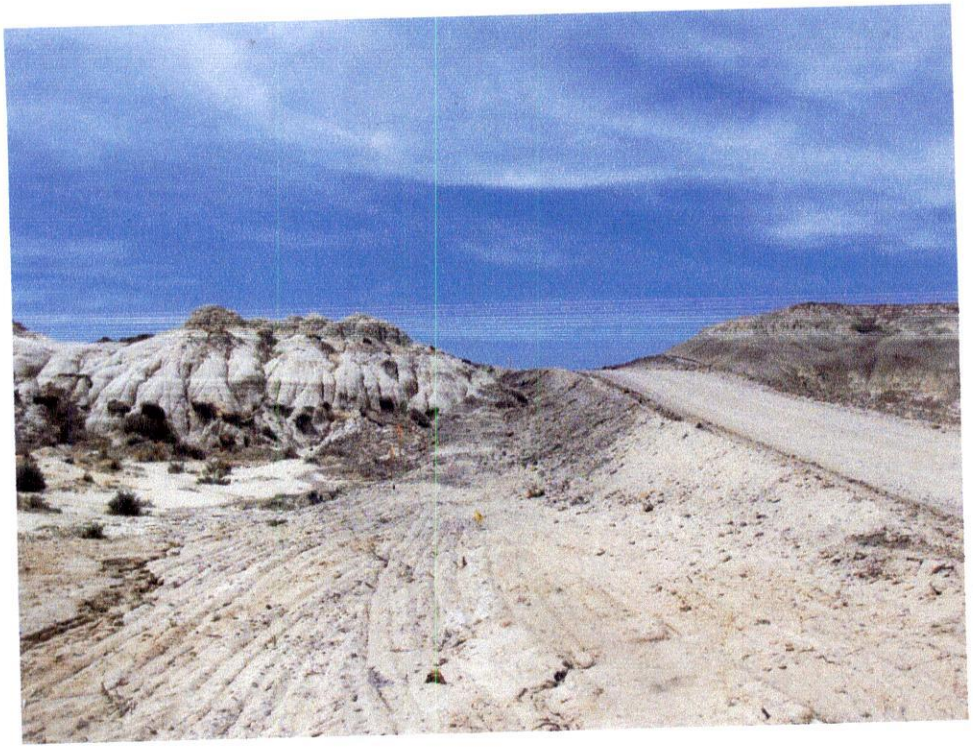

Figure 9: Existing disturbance along right-of-way. View is to the east.

Figure 10: *In-situ* Fossil turtle carapace in gray to orange mudrock of the Nacimiento Formation. Field Locality JHB 1501.

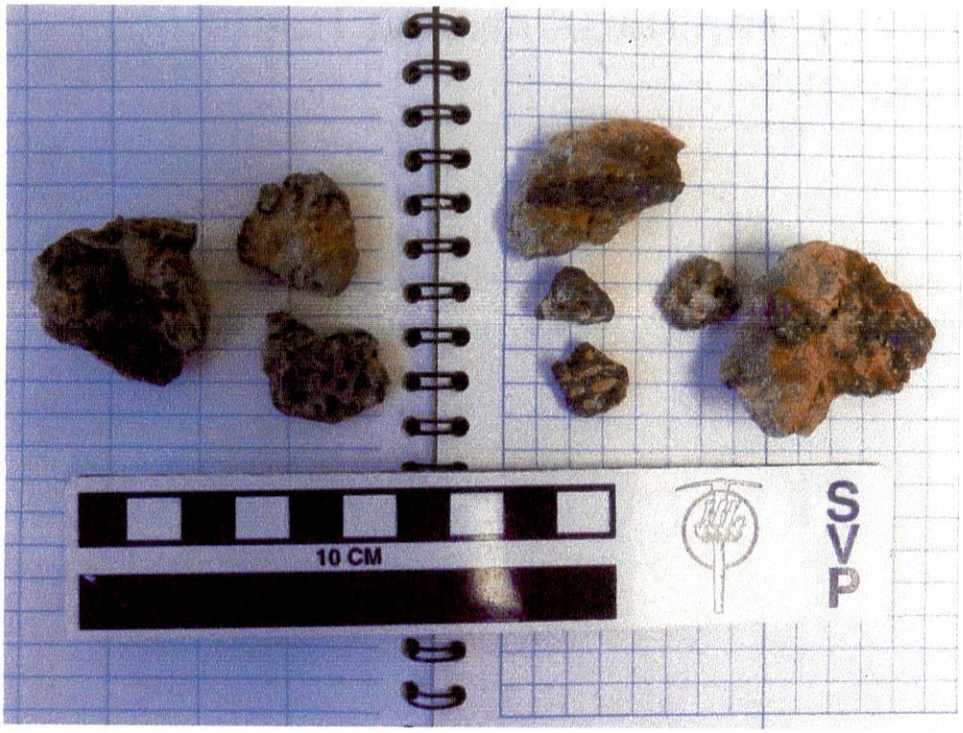

Figure 11: Fossil crocodile scutes and bone fragments found as float in gray mudrock of the Nacimiento Formation. Field Locality 1502.

Figure 12: Fossil bone fragments found as float in gray mudrock of the Nacimiento Formation. Field Locality 1503.